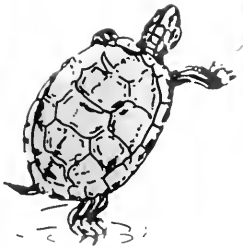
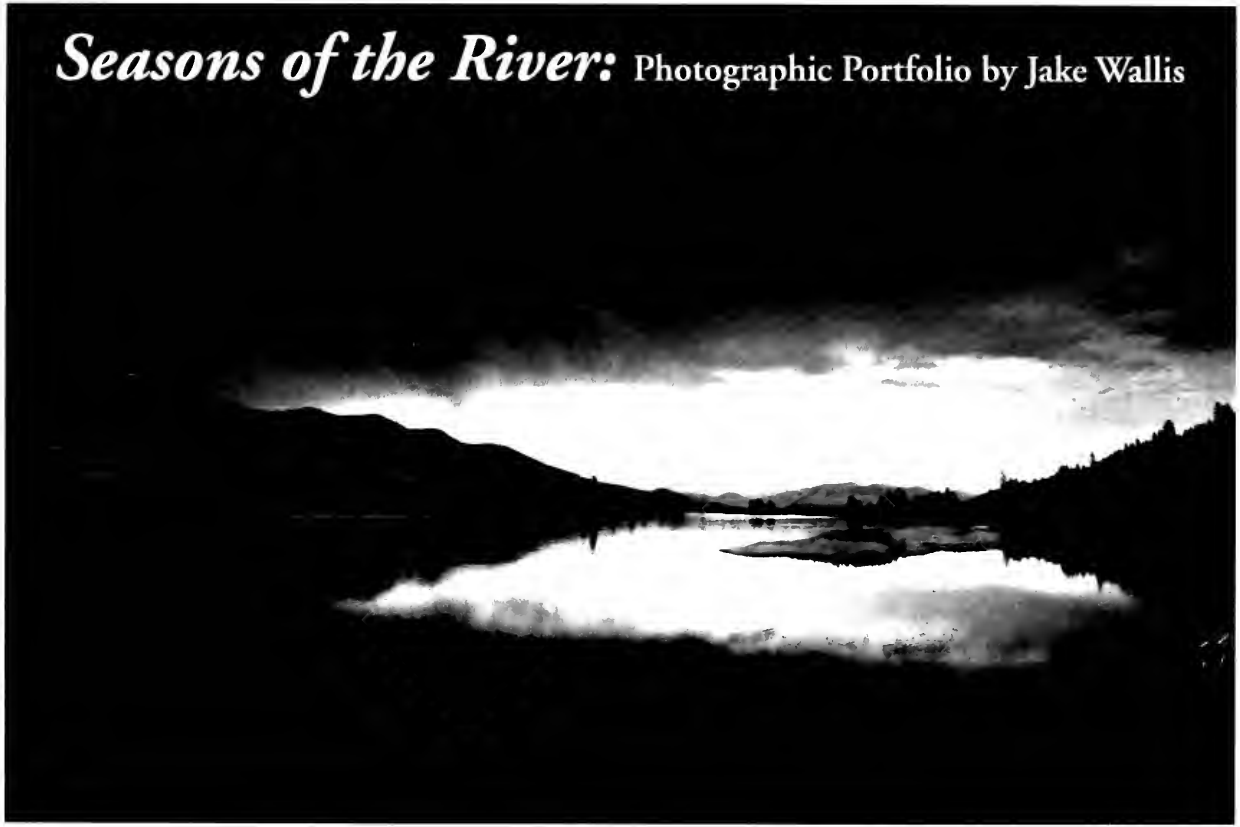
čłq̓étkʷ ntx̓ʷétkʷs
ʾa·kinmituk



The Lower Flathead River
Flathead Indian Reservation

Seasons of the River: Photographic Portfolio by Jake Wallis



Flathead River Creation

for the students of the Two Eagle River School

You say
old days fold into one another
and new days seem the same.
Yet each moment shifts with sun,
nothing will be the same as this:
when wind breathes the Flathead alive,
you are the center this instant
for all, you are the creation
of the universe one more time.

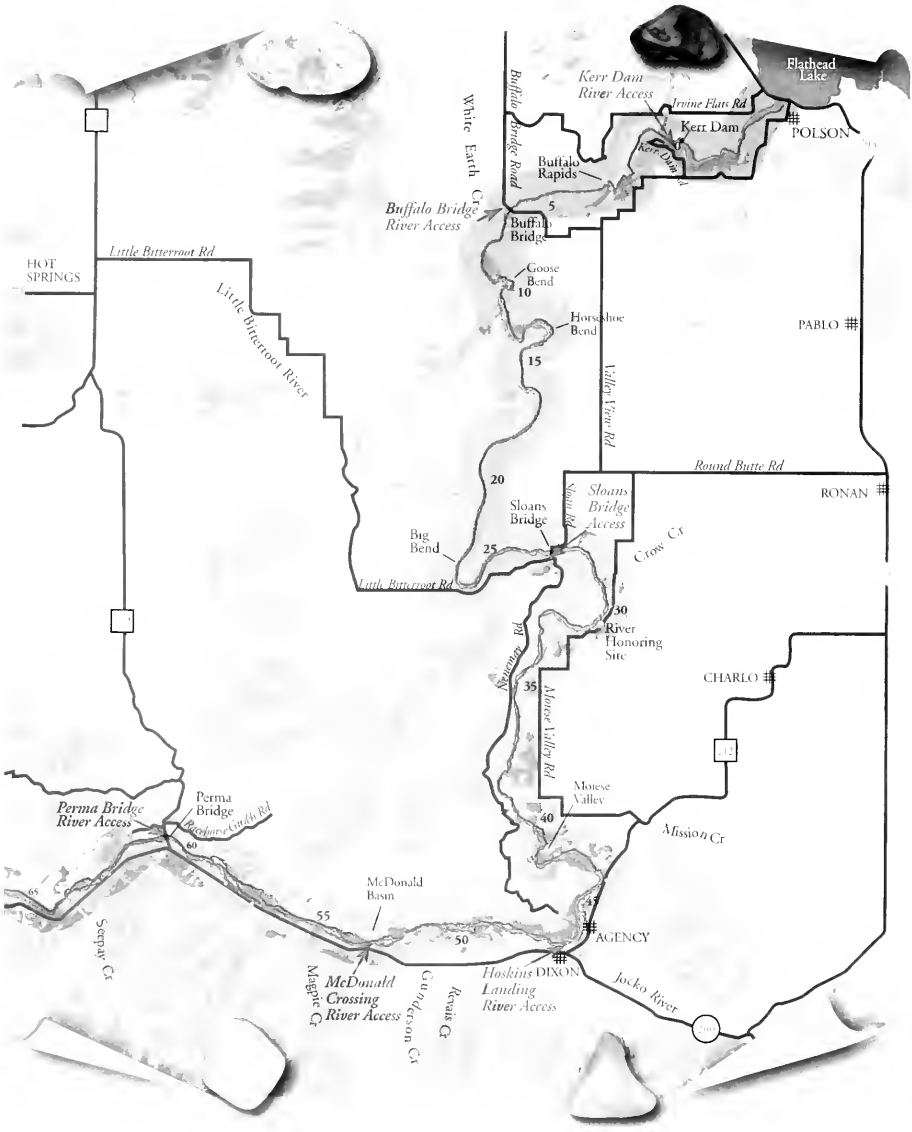
by Vic Charlo

Dixon Direction

for the students of the Two Eagle River School

Directions are simple here.
Geese know where to fly. Yet sometimes
you get lost on wrong roads.
Then
when you come to school,
you seek from this high window
and find living river, red willow,
white aspen, old juniper and pine.
This is you.
And bright clay cliffs fix the stars.

by Vic Charlo



Lower Flathead River, Flathead Indian Reservation, Montana

Darker green around river shows Confederated Salish and Kootenai Tribes River Management Corridor

čłq̓étkʷ ntx̣ʷétkʷs ʾa·kinmituk

The Lower Flathead River
Flathead Indian Reservation, Montana

A Cultural, Historical, and Scientific Resource

Compiled by David Rockwell
Revisions by Bill Swaney

Sponsored by the Confederated Salish and Kootenai Tribes Education Department
and the Salish Kootenai College Tribal History Project

Published by Salish Kootenai College Tribal History Project
Pablo, Montana
2008

The title is taken from the Salish and Kootenai names for the Lower Flathead River. čłq̓étkʷ ntx̌ʷétkʷs literally means "River of the Broad Water" in Salish; ʾa·kinmituk literally means "river" in Kootenai.

Funding for the development of this project was provided by the Natural Resources Conservation Education Program and the Salish Kootenai College Tribal History Project funded by the Montana State Legislature.
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Natural history drawings in chapter 3 are by Janet McGahan.

Additional illustrations, tables, and text are by David Rockwell.

Photograph of Flathead River Honoring encampment courtesy of CSKT Natural Resources Department (page xvi).

Edward S. Curtis, *The North American Indian* (Norwood, MA: Plimpton Press, 1907). Page 1 (detail from volume 7, folio plate 249); page 8 top (volume 7, page 60); page 19 (volume 7, page 40); and page 48 (volume 7, folio plate 236).

Toole Archives and Special Collections, Mansfield Library, University of Montana—Missoula. Page 5 (M82-46); page 6 (M78-255); page 7 (M82-98); page 18 (M78-252); page 20 (M82-21); and page 22 [486(1x)29-164].

Photographer Charles Owen Smithers, Sr., Smithers and Son Photography, Butte, Montana. Pages 23-31, 33, and 48.

Charles M. Russell, *Good Medicine: The Illustrated Letters of Charles M. Russell* (Garden City, NY: Doubleday & Company, Inc., 1930), page 139. Drawing on page 43 below.

Copies can be ordered from
Salish Kootenai College Press
PO Box 70
Pablo, MT 59855

This book is dedicated to my mother
Opal Swaney Cajune

My mother grew up along the Lower Flathead River. She learned to swim in the river and she has been a strong swimmer all her life. The old house the family lived in is gone now, but Mom hung on to that small piece of land and today her grandson lives on it.

There are an infinite number of beautiful places along the river, but there are a few treasured places, sanctuaries, that I have come to know intimately. One of these sites is my mother's favorite camping spot. I have memories both in photograph and heart of multi-generational family gatherings there.

Along the river bank there is a feeling of hope and healing. There are stories in the community of healing songs that have come down the river. If you spend time along the river you will come to know its power and gift.

This book was compiled to support the Confederated Salish and Kootenai Tribes' annual River Honoring. It was hoped that it would encourage teachers, students, and others to appreciate the learning opportunities waiting at the river.

Funding for the book initially came from a Natural Resource and Conservation Education grant when I was working for the Confederated Salish and Kootenai Tribes Education Department. The book was compiled through the generous efforts of David Rockwell, but there was no funding to publish it. Years later, Governor Brian Schweitzer put forth an initiative for Montana tribal colleges to write tribal histories. The Montana Legislature funded the governor's initiative, and funding was administered to all seven tribal colleges through the Office of the Commissioner of Higher Education. As the director of the Salish Kootenai Tribal History Project, I was able to bring the volume to completion with the help of Bob Bigart.

Julie Cajune
Salish Kootenai College Tribal History Project
Pablo, Montana
December 2007

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CHAPTER 1

THE DAYS OF THE ANCESTORS

LIFE ON THE RIVER BEFORE THE RESERVATION

Our story began when the Creator, the Maker, put the animal people on this earth. The world was not yet fit for The People because of many evils, so the Creator sent Coyote and his brother Fox to this big island (as the Elders call North America) to free it of evils. The two brothers created mountains, valleys, and lakes, and rivers. They discovered special skills and knowledge that The People would later use. However, Coyote, being Coyote, left some evils in the world. Many of the imperfections that we know of today — greed, jealousy, hunger, envy, and anger — are what Coyote chose to leave in the world.

The Elders tell us that Coyote and his brother are waiting at the edge of this island, and that one day they will come back. If, when they return, we are not living as one creation, as part of one big circle, it will be the end of our time, the end of this part of the universe.

Salish-Pend d'Oreille Culture Committee

The Salish and Kootenai Tribes and their Traditional Way of Life

The Flathead Indin Reservation is home to two major Salish-speaking tribes Salish and Pend d'Oreille—and one band of the Kootenai Tribe. This chapter describes, in a general way, the cultures of those groups. It highlights values the tribes hold for the natural environment, and it outlines historical events that led to the tribes' loss of land and resources. A basic knowledge of these histories and tribal cultures is crucial if one is to understand the history of the river and the tribes' present-day natural resource philosophy, which now governs management of the river.

The origins of the tribes reach back to the beginnings of human time. Elders of the Salish, Pend d'Oreille, and Kootenai people all tell of Coyote and other animal-people who prepared the world for the human beings who were yet to come. Coyote destroyed the Nałisqélix^{w}— the Ones Who Ate Human Beings. As the signs of his deeds he left behind countless landmarks, a sacred landscape that tribal people have related to through traditional stories for millennia. The stories emphasize the interdependence of all living organisms and remind us that animals came first to this earth and are the cradle of our existence. The stories continue to inform the tribes' relations with the land, the plants, and the animals.

Although each of the tribes on the reservation is culturally unique and has its own belief system, they are similar in at least two respects: each possesses a thorough knowledge of the natural environment and each has a profound respect for all of creation. Both traits enabled the tribes to live sustainably within their environment for thousands of years.

The profound age of tribal inhabitance of the region is suggested by the numerous tribal legends that closely parallel geological descriptions of the end of the last ice age: the draining of Glacial Lake Missoula, the retreat of the glaciers, the establishment of a more temperate seasonal regime. The millennia of habitation, experience, and observation resulted in an intimate connection between people and place and a depth of understanding that is often difficult for non-Indians to appreciate.

The Salish, Pend d'Oreille, and Kootenai practiced a cyclical way of life based on the harvest and seasonal abundance of a tremendous variety of fish, game, and plants (for both food and medicinal uses, as well as material culture). This way of life was suffused with a spiritual tradition in which the people, both as individuals and collectively, respected and sought help from the animals, plants, and other elements of the natural environment. In many aspects of their mode of subsistence tribal ancestors sought to conserve resources for future generations. They succeeded. Clean water, clean air, and animals like wolves, grizzly bears, wolverine, lynx, cougars, and eagles still reside here, though they are absent from much of the rest of North America.

These tribal ways of life continue to this day. Indeed, tribal people are today a physical manifestation of the hopes, prayers, and dreams of tribal ancestors and elders. This is true because of the place of honor that tribal elders hold in Salish, Pend d'Oreille, and Kootenai culture and because of the knowledge that traditionally passes between the generations of the tribes on an individual level. In other words, there is continuity between the beliefs and actions of the past and those of today. That continuity is reflected in the

Figure 1-1. Chief Charlo and his family, circa 1900. Before Europeans arrived, camps like this one were a common sight along the river.

values and goals underpinning natural resource management on the reservation. The tribal Forest Plan, for example, emphasizes restoration of the forest over the economic returns it could provide. For Salish, Pend d'Oreille, and Kootenai people, the beauty and sacredness of pure water and an uncluttered view of mountain peaks cannot be measured by monetary or legal standards and is a cultural value in and of itself. It is these traditional values—in essence, viewing the land in a spiritual way—that distinguish the tribes' relationship with the land.

Because of this spiritual connection, many of the ways in which the Salish, Pend d'Oreille, and Kootenai traditionally use the river are not discussed in this book. The tribes prefer not to describe specific spiritual traditions and beliefs in a public document.

Sqélix^{w}—The People

The Salish Tribes

On the Flathead Reservation, the designation "Salish" refers to Salish-speaking people, including the Bitterroot Salish, the lower Pend d'Oreille, the upper Pend d'Oreille and Spokane Indians who settled on the Reservation. (The Pend d'Oreille, both upper and lower, are also known as the Kalispel.) Elders say that these and other tribes were once one Salish-speaking tribe. Thousands of years ago this ancestral tribal group divided into a number of different bands that later became tribes and occupied much of the Northwest, from Montana to the Pacific Coast.

The various bands of the Salish and Pend d'Oreille traditionally occupied a vast territory ranging from Yellowstone and the Three Forks country to the Musselshell and Sun River and throughout the valleys of what is now western Montana—the Flathead, Clark Fork, Big Hole, and Bitterroot.

Some bands lived throughout Montana from the Bitterroot to the Yellowstone Valleys; the Pend d'Oreille eventually settled in the Flathead Valley; and a band of Kalispel camped along the Flathead River near Perma, Camas Prairie, and Paradise.

Oral history has always been important to the Salish people. Even today elders tell Coyote stories during the winter months, as Salish elders have done for thousands of years. These stories, like the revered scriptures of other religions, explain the nature of the Creator. They tell of creation and of the origins of natural phenomena. They speak of the unity of life, and stress respect for the land and the living community it supports. They teach that The People are part of the natural world, rather than being separate from it. They also teach children to be respectful listeners so they understand the lessons of their own lives, and so they can pass the stories on to future generations when they become elders.

Before the time of the reservation, the Salish tribes gained sustenance from a tribal system of hunting, fishing, and harvesting. The Lower Flathead River was central to this way of life. The quest for food began in the early spring with the bitterroot harvest. tribal leaders appointed elders to keep watch until the bitterroot was ready. When the time came, the leaders called the people together to dig enough roots for a feast to celebrate the year's first food and to pray that food would be plentiful. Many digging sites were located on hills overlooking the Lower Flathead River.

Along with bitterroot, the people harvested other plants such as camas bulbs, tree moss, onions, Indian potatoes, Indian carrots, and a host of medicinal plants. Many could be found growing at the river's edge or on the uplands adjacent to the river. The people fished year-round. In summer and fall, the Salish hunted and picked berries; first strawberries and service berries, later huckleberries, raspberries, chokecherries, and hawthorn berries. All of these activities were communal. The people worked together and helped each other.

In the fall, the men concentrated more on hunting, while the women dried the meat and prepared hides for robes and buckskins. The Salish hunted many different animals, but mainstays were deer and bison. Deer could be found along the river.

Figure 1.2 What a camp along the river may have looked like 200 years ago.

For buffalo, the Salish traveled east of the mountains every year.

When the Indians are going to hunt, they have a head leader called a Situs. There will be many, many young men. And when the Indians move from their regular homes and get all their camps set up, they would have their horses all herded back. Everyone at camp was afoot. Then it will be agreed that a certain place was where they will hunt in the morning.

The next morning the men go to this place. It might be a wide place in a draw. They would say, "This one particular draw or canyon is where we will hunt"... They killed around a hundred deer. They didn't kill them all, and they turned the rest loose. The children who were old enough and also the women went along to drag the deer back to camp... It was really something to see...

The Indians did this type of hunting until there was enough meat supply to last them a long time. Then the Indians went back after their horses, which they herded back to their regular homes.

My father was with this group of Indians when they went hunting. He was the one who told me this story.

— *Pete Beaverhead,*
Pend d'Oreille elder, 1975

After a group hunt, the hunters divided the meat among all the people in the camp. They piled cut meat in one place, and people from each lodge took what they needed. The successful hunters shared with those who were unsuccessful. The tribe used everything and wasted nothing.

The Salish spent the winter months trapping and fishing. Women repaired clothing and sewed new garments from deer and elk skins. They decorated their work with porcupine quills colored with natural dyes.

Each tribe had a leader or leaders (ilmix^{w}m) chosen for their character. The leaders governed by consensus, under the guidance and advisement of respected elders. Different leaders had particular strengths or skills and their responsibilities reflected this. One chief might be in charge of the hunt. Another might lead various camp activities. A third would command war expeditions. Pete Beaverhead once said, "In most of the stories there are three big chiefs above all the rest of the people. They are all regarded with the same respect. None [is] higher than the other two. This is among the [Pend d'Oreille] Indians. Then the smartest warriors are right behind them; there were always very many of these men."

The earth was good to the tribes. It provided not only food, but also material for making lodges, tools, clothing, and games. The Salish made their lodge coverings from elk and buffalo hides. They fashioned tools such as needles, mauls, and grinding stones from wood, bone, and rock. They travelled long distances to collect raw materials not available locally. They had a strong trade relationship with the Nez Perce and traded bitterroot and high quality buckskin for Nez Perce corn-husk bags filled with camas.

Before the introduction of the horse, the Salish used travois to haul possessions between camps. They built travois by tying a hide between two poles. The load rested in the hide.

The Salish always set aside time to celebrate, to sing and dance, to visit and play games. The People held celebrations after battles, successful hunts, and other important events. They interwove song and dance with daily activities. Felicite McDonald, a Salish elder, recalled that every morning a few people walked from lodge to lodge singing a wake-up song. Both children and adults played games like shinny and hoop and dart.

Aqɬ smakni·k̓—The People

The Kootenai Tribe

Before contact with non-Indians, the Kootenai Nation (also spelled Kootenay or Kutenai) numbered over ten thousand. Kootenai Indians inhabited what is now eastern British Columbia, the southern half of Alberta, northern Idaho, eastern Washington, and Montana. The Kootenai band that lived in the Dayton area called itself Aqɬ smakni·k̓, which translates as "Fish Trap People." The name comes from the Kootenai practice of setting traps in the creeks and river during the large fish runs.

The Kootenai moved seasonally over a large territory. The seasonal round began in the early spring when the people travelled to fishing grounds. There the Kootenai caught bull trout, cutthroat trout, salmon, sturgeon, and whitefish using a simple bone device and line and harpoons with a detachable barbless point. They also set traps and weirs in streams and rivers.

In early May, as the fishing season came to a close, the root harvest began. The people dug bitterroot, camas, and other roots. In mid-June the band traveled east of the divide to hunt buffalo. Weeks later they returned with heavy loads of meat. From middle to late summer the Kootenai harvested service berries, chokecherries, huckleberries, and other fruits. When fall approached, some of the Kootenai organized communal deer drives; others returned to the plains to hunt buffalo. The tribe cached surplus food for winter.

Deer were the most accessible and abundant of the game animals, and deer meat was one of the most essential foods, but the Kootenai also hunted elk, moose, caribou, buffalo, mountain

sheep, and bear, and birds such as grouse, geese, and ducks.

The Kootenai lived in skin and mat-covered tepees (the latter woven from tule and dogbane). They used canoes to transport family and gear and to fish for salmon. They manufactured a unique covered canoe with a long projection at both bow and stern.

The Kootenai always had time for story telling and games. Girls played with dolls that, according to Helen Charlo, were "made mostly out of buckskin and deer hair." Paul Mathias said boys made bean shooters and sling shots for hunting rabbits and groundhogs. Mary Antiste has talked of how boys made bows and arrows. Others told of how children made tops by winding strings around oval rocks. By pulling the strings they could make the rocks spin. The adults played a game called shinny. In the evenings they told stories.

During times of peace, the Kootenai traded with other tribes, such as the Shoshone, Nez Perce, and Blackfeet. Other tribes coveted the native tobacco cultivated by the Kootenai. The Kootenai traded it and their famous tanned buckskin hides for stones used to make pipes, various tools, and other goods.

Tribal Elders Speak about the Traditional Way of Life

Excerpts from interviews from *The Place of the Falling Waters*

Agnes Vanderburg—Salish elder (1901-1989) (translation by Lucy Vanderburg)

[A long time ago we ate] dry meat, bitterroot, moss, baked camas, pčíú [biscuitroot], chokecherries, serviceberries, wild carrots, dried fish, and all kinds of dried things because we did not have a freezer....

Meat was passed around until everyone had enough for winter. People would be getting meat, fish; women looking for roots in fall. Got a lot of meat for the winter. Men went out in the morning hunting and would come back with meat.

Well, my dad used to take nine families. They have their own tepees, their horses. Each tepee had a....big family. Nine tepees. So when they get meat, they pass it to every tepee till everybody gets enough for the winter.

Women did their hide work. Everybody was busy. That's how she learned everything, by doing it.

Lot of fish and game back then. Kids fished. Could get fish even with just a straight pin and thread.

John Peter Paul—Pend d'Oreille elder (1909-2001)

Even the bones—when they really come back, the women pound that...cook it. That's where they get this tallow, what they call it. They never waste anything, those days....

Question: So I am curious about what the old timers said about why the dam shouldn't be built?

Answer: Well, they really figured it was sacred...there, the fishing, and all of that.

These quotes were obtained from interviews conducted in 1988 and 1989 by Thompson Smith and Roy Bigcrane as part of *The Place of the Falling Waters* film project.

Figure 1.3. The spé·m (bitterroot) harvest

Joe Antiste— Kootenai elder (1894-1989) (translation by Sophie Matt)

That's when I found out how the Indian people snagged fish. That's what the Indians done, snagging. They make their weir traps, then the fish go into them. This is what the Indians lived on.

That's what the Indians lived on, meat. Camas, wild potatoes we dug, wild onions were baked. From trees they took moss. They put the wild onions in a pit they dug and cooked it. The moss is used to cover the wild onion and a fire is built over this. This was done until cooked. This is what the Indians lived on.

When the Indians got through digging bitterroot and camas they would move back and just live leisurely. In wintertime when the ice formed, the Indians would fish. This was their livelihood.

There was not anything else. For them it was just fishing, and that's what the Indian people lived on....The Kootenais made fish weir traps, and this is how they caught the fish to live on. That is what the Kootenais lived on: meat, camas, wild onions.

Indians took moss from trees. When they were ready to bake camas after the pit was made, they baked the camas, moss, and wild onions. When the moss and wild onions were done baking, it looked like a cake and pieces were broken off and eaten. This mixture was sweet. This food we lived on years ago.

Figure 1.4. Abandoned teepee.

After the bitterroot and camas were dried, the Kootenais moved back to Elmo and Dayton and settled for the winter. During the winter months, they fished through the ice. At that time of year fish were plentiful.

In the wintertime, they built their shelters from fir trees—a long house. Several families lived in one of these long houses. They all had bonfires burning. This is how they spent their winters. These long houses were built in areas where there were dry trees for fuel.

Louise McDonald—Salish elder (1904-1994)

We used to go fishing there. Whitefish, trout, suckers, something like that. Lots of bones...we don't eat suckers. Too many bones. Some does [eat suckers].

Then one time my dad went and there was bull trout, I think, when he got one wide and really big. It's about that tall standing up. Really big one. Comes church. I suppose they passed it around. It's good fish.

Then people goes fishing here and there. Down rivers, go camping, just go fishing. But I guess they dry it sometimes. Some dries it. Some, they just use it the same day they get it so it don't spoil.

The people don't waste the meat, them days. They clean the hide, they scrape the hide from the inside. The meat—they dry that, they fix it—even the head.

All the people really take care of their deer....don't play with the meat, don't play with the horns, foot, feet, legs. They take care of the bones good—tie it up and hang it up, whatever they not going to use.

That's what they do.

That's what I know.

Tony Mathias—Kootenai elder (1922-1996)

When I was just a kid, we used to go out and live in a tepee, out in the woods. My dad used to go out and hunt for deer, and bears too, at the same time. When we came back here, then we would have a lot of dried meat. But sometimes, like in the winter, he would go out on horseback and get a deer. That was our fresh, fresh meat. And then we eat the fresh meat for a while, then we would turn around and fix dried meat again.

That was the last time he would go down towards the river, down there by Buffalo Bridge, on down. We used to get beavers there. We used to have beaver sometimes in the wintertime. 'Cause they would be selling the beaver hides. When they get it, that's what we used to eat, is beaver meat.

A lot of these old people, like these women folks rather, they would go out in the summertime, they pick chokecherries, and serviceberries. Like bitterroot in the springtime, and also camas. That's all we used to live on in the wintertime.

That's the only thing we used to do, what my people used to do around here at that time. I am now 67 years old [in 1988]. And that's when I was around eight, nine years old [c. 1930], that's when I could remember them things—what we used to do, hunting grouse, everything we used to eat. There was no such thing as potatoes, hardly anything like that....

People used to go all over. Even in the summertime they used to go hunting. And go up and get elk—well, anything, like moose, bears, beavers. But in the fall they don't, but they used to just trap them. Trap beaver, even muskrats....

Around May, the first part of May, they would start digging their bitterroot. They got through digging bitterroot, and then it was camas. They used to pick that, and cook it. And then they used to put that away for the winter....Then in the fall, that's what my people used to go out and go hunting and dry meat. About two or three suitcases full of it. That would last us all winter long. Just once in a while in the winter we would have fresh meat. Sometimes they would boil it. Sometimes they would take a rock, two rocks and put them together and they would pound their meat. Make it fine stuff, make it fine meat. And we would have that, dried meat, what you call it. They used to even put grease on it, on the meat. That's the way we used to eat it....

Question: One thing that a lot of elders have talked with us about is, how much the old ways were close to the earth. And I always wondered if some Kootenais felt that it wasn't right to build that dam on the river.

Figure 1.5. Creek Crossing.

Answer: Up there, well some of them didn't like it, because that was their....where the spirits is at. They had a hole there at that time. But I've never seen it, to this day. And that's what the.... Indians didn't kind of like it, on account of building that dam there. Because that's where the spirits is at.

Just like in a, what you call it, on the, on the other side of Libby [Kootenai Falls]. And the white people wanted to make another dam there, and that's why we kicked about it. Because that's our place, just like they're taking care of us.

Question: Did anybody have feelings that maybe it wasn't a good thing to do to build the dam in that place, to dam up that river?

Answer: Yeah, a lot of the old timers did. But finally some chiefs went there. Hell, it was the best fishing ground, right around there. A lot of people got killed. See, the Indian got first preference on the job. A lot of men killed there.

Figure 1.6. Making sccqye (dry meat).

Joe Eneas—Salish-Spokane-Colville elder (1896-1997) (translation by Dorothy Felsman)

In the spring they would start out by picking bitterroot, I guess, then camas, onions, white onions, carrots. Then there would be hunting all the time. Birds, ducks, prairie chicken. And there was a certain bird called curlews, it has long, long legs. We used to get them too. And all these other kind: grouse, pheasants. And all these rabbits—that not too much. Whatever they could get. That's all there was. In the woods there would be woodchucks, just like ground hog. And of course deer always.

Question: Were the women's and men's jobs different in the old days?

Answer: Not a lot, but....only the....I know that Indians, they're thinking, they think that the woman, they're the ones that have the job of chores for getting wood. So they go and get the wood and carry it back. That was what the women did. They made the meat ready for drying everything—the roots and other things, camas, bitterroot, the berries, all of them, everything. All of the food, that was the woman's job a long time ago.

So the men, they would be watching out. See, there were enemies a long time ago. They didn't know when they could be killed, and that's the reason the women made it as easy as they could for the men. Anytime they could have been killed. So they work, they are looking for food, animals so

pulp
Rocky Mountain Juniper

that they would kill it, and they bring it back. So the women, they fix the meat, they dry the meat. The women had to do everything. They take care of the children.

Question: What about hunting birds?

Answer: .... Oh! For ducks? Yes, for ducks—in the summer. Over here on the flat. Yes, ducks are what we hunted....When I came home, I had a few tied onto each side of my horse. Once in a while there would be no ducks. When it would get too warm, they went over by the trees. That's where they went because it was too hot. So there were none down here, none.

Question: Also geese?

Answer: Yes, some, not very many. Only when they came through—then some....

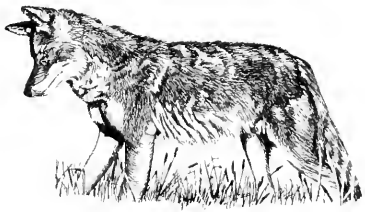
About the Kerr Dam site:

So the water used to go [makes sign for whirlpool]. There was kind of a hole there. That was a long time ago. That's where we used to go fishing.

It was good.

The Indians called it at that time Sq̓x̓etkʷ ("Rapids"). Because the water drops fast there—that's why they call it Sq̓x̓etkʷ.

Well, that was a fishing place. That's all I remember.



Tribal Elders Speak about Life on the River in the Old Days

Excerpts from interviews recorded for *The River Lives.*

John Stanislaw—Pend d'Oreille elder (born 1932)

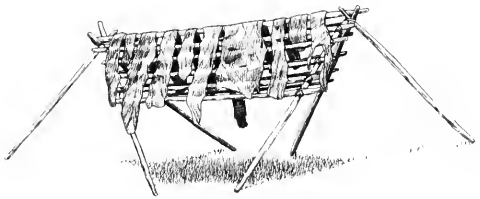
Spirituality had a meaning long ago. I guess that they had their vision quests along the river, medicine dances along the river. I respect those grounds where they've had those....Well culturally there's a lot of landmarks along that river....but a lot of it is on what they call white man ground now. A lot of it that was told to me was probably according to the Coyote tales.

Tony Incashola—Pend d'Oreille elder (born 1946)

Being down here by the river in this place here brings back a lotta memories. It's been about 15-20 years since the last time I camped down here with my family. We used to be camped right in this area. Camped here usually in the spring or fall to come and get our supply of meat. We'd spend at least a couple of months along the river here sometimes three depending on the weather....in those days I was too young to go along most of the time, so my brothers and my dad would go up and hunt for the deer. And I'd, a lot of times, I had to stay at camp with my grandmother and help around camp or help my grandfather. My grandfathers used to—was getting up in age so he never did any hunting anymore. He'd go down there by the river and spend most of his days down there catching fish. Any fish that he did catch was eaten right away. They very seldom dried it, but the deer that they got, that was dried and stored for the winter.

I remember, whenever we went camping, if it was possible, you know the first things my dad would do is put up a sweathouse. And in the spring time when we were here, the river was high enough to where the water would come in behind and from a little pond back here, so we'd put the sweathouse up. So whenever they came in from hunting in the late evening when everything was all done for the day, they'd take their sweats and that was a daily thing that they did. Everyday they'd take a sweat.

My grandpa would be fishing all day long and if they got any deer then my grandma would start cutting the meat up and drying it. That would be a process going all through the cycle of the camp while we were here. The men would be hunting to bring in the deer and my grandmother would be cutting and drying and my grandfather would be fishing....It's been good to come down here again and remember all of that. All the growing up I did along the river.



My Story About the River and Its People

by Alice Nenemay Camel

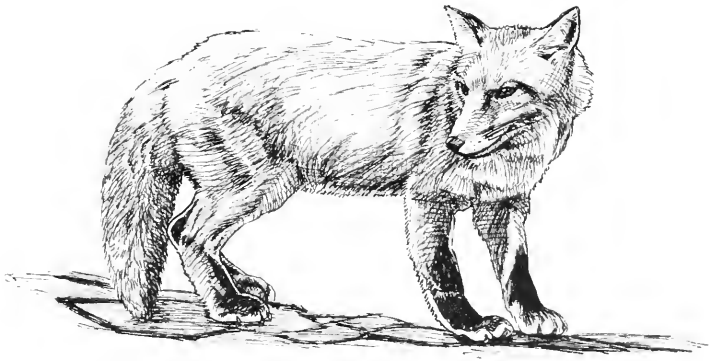
We lived close to the river. We all enjoyed that place by the river. It was so cool, so clear, and free from pollution with all the green moss that had grown along the riverfront. My family had a little island on our place with a cliff where we used to jump from. I wasn't afraid! It could be dangerous if a person slipped or stubbed a toe, but we never had an accident.

We, the Nenemays (Mom, Dad, Aunts, Uncles, and Grandfather), arrived from Idaho and Washington and found a suitable place to build our houses. We made our living raising great thoroughbred horses and cattle.

We used to enjoy the river where we lived. I remember my mom would swim the river when the water was high from the spring thaw. The waves were like the high ocean waves.

My grandma would stay close to the river while we kids swam. Believe it or not, I didn't know how to swim. I thought I was going to drown once when the current was really flowing with big waves. My sister jumped into the river and saved me. We never told our parents. I learned to swim after that.

My grandma once told me the Indians before us, who lived in tents, would climb up and down trees to pick moss to bake later. They were from the Mission. Many Indians came to the river to fish. They'd put up their tents and fish for a week or so. They would dry their catch.



During the winter, when the river froze over and the ice was about one and a half feet thick, we'd chop a hole in the ice, build a little fire, and fish. At that time we caught whitefish and bull trout. It was winter and you had to dress warmly to fish and get your catch. Many of us Indians fished the cold weather. Around February was the best time to fish. A few local Suyapis went there to fish also.

My grandma, who lived by the river, hauled water buckets for washing and drinking. The water was sparkling clear. It's been a long time and things have changed.

When my mom died, I had to move away because there was no way for us to live by ourselves. My sister had died and two small brothers also died (that same year). My Grandma Suzette gave away all of my mother's personal things. We eventually sold our allotments for seven dollars an acre.

Sixty years later, I went back to where we once lived. All I saw were bad weeds growing everywhere. The river shore was trampled with cattle and sheep droppings, and the spring that used to have sparkling fresh water is gone. Nothing but cattle aftermath!

I braced myself not to scream or cry, and turned away from what used to be. It was no longer there; even the river shores were no longer beautiful.

Our land was sold after my mother died. There were three of us kids under age, and we couldn't live at our house anymore. So, we moved a ways up to Post Creek. Hillside School is where we went to school.

Growing Up on the River at Dixon

by Opal Cajune

September 11, 1998

Some of my earliest memories are of the river. I remember walking down through the sand back of Auntie's barn toward the river and smelling that first damp slightly fishy smell and breathing very deep to absorb it all. My mother cooked our dinner in a big iron pot over an open fire. We stayed all day playing in the water. I think it was in that place that I first learned to swim.

When we got older we could go across the bridge by ourselves and swim on the other side. Most summers we spent all day there. It was kind of a "rite of passage" when a young person was able to "swim the channel." That meant swimming from the shore to the island as soon as the water was not so swift as to carry you downstream. I did that many times,

The island was a magical place; wooded with warm pools deep enough to swim in all lined with sand.

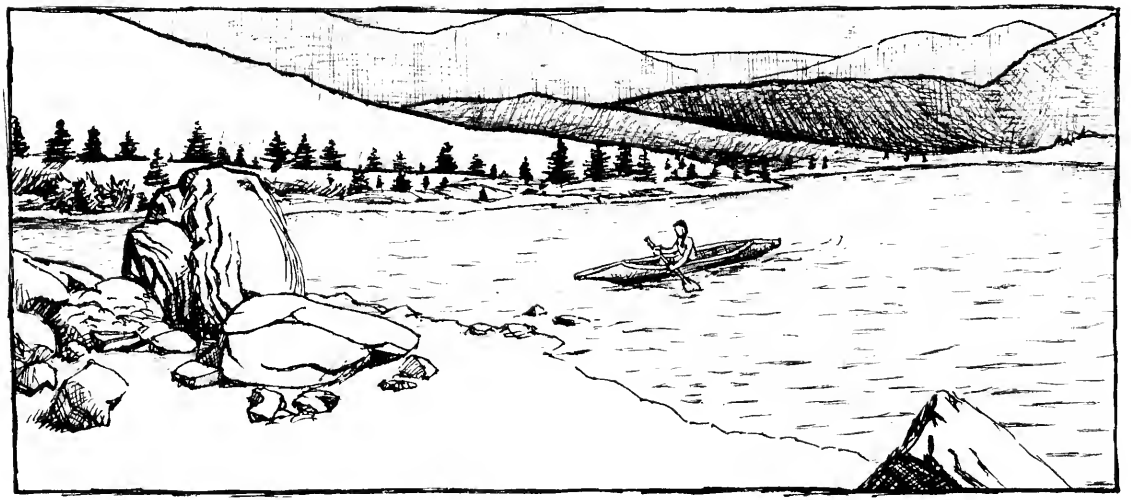
Down by the "old ferry" past the bridge it was a pure delight to see how far you could wade out into the river. Sometimes you could almost wade across except the water was so swift you could not stand up. I did that again several years ago and the wonder and delight was still there. In the spring and fall we would walk across the bridge, build a campfire and listen to the wind in the pine trees. The trees there by the river sing their own song. I have listened for that song in other places, but they sing a different song in the mountains. The river trees sing a song that gathers you in and holds you in a special healing place wherever you are whether on it or in it or by it. The river has its own magic that calls you back. I like the words of this man who had his own river:

> I know the sound the river makes by dawn, by night, by day.
> But can it stay me through tomorrow that finds me far away?
> — Author unknown

I caught my first fish in the river with my dad helping me. I can still see the two Indian women who fished the river at Dixon. We would see them go by in their canvas shoes or waders with their poles and straw hats. They would be gone a long time. They might stop later to talk about their luck that day or to show their fish.

In the spring and early summer the river got very high. People from town would go by our house every day to measure how many feet the river had risen. This was scary and exciting to the children. The river would come up to the top of the bank and overflow in some low places. One place was by our house and we would then swim in the slough created in the ditch where the water was warm and the bottom soft and grassy. At night, with the windows open, the river made a roaring sound. The older people would discuss "the high water" at great length and wonder if the piers would hold up what with all the big logs and trees being washed down. Sometimes I would venture over to the bridge and look at the deep rushing water with whirlpools everywhere. It taught me to respect the power hidden there and later when we could swim in it as the river tamed and receded we were very careful to not get caught in a whirlpool.

During the swimming season, every one in our little town swam there. Even Mrs. Daniels. We were quite awestruck when this portly lady showed up in her vintage woolen swimsuit. The children would all hold their breath as she waded in, looking to see if the river really did raise two feet when she got in as one old man predicted. It would be an especially exciting day if Jackie Liberty came because he would climb to the highest part of the bridge and dive off the very top in a beautiful graceful swan dive right down into the swirling whirlpools. Everyone waited to make sure he came up before the water play began again. There was a feeling of community evolving around the river for that short season and children would feel so very comfortable in it. I can't measure how much the river added to the quality of our lives but I know it lives on in my family. The river was always there for me like a patient waiting presence. Predictable in its seasons, dispersing a blessing to who ever would receive it. It has not changed. I still get the same feeling when I wade into the water, feel it close over my head and open my eyes to the murky green. I come up out of the water feeling like I am part of the river, a new creation, a river spirit.



Origin of the Flathead River

This story was told in 1900 to Major R. H. Chapman and recorded in Ella Clark, Indian Legends from the Northern Rockies *(Norman, OK. University of Oklahoma Press, 1966), pages 166-167. Copyright 1966 by the University of Oklahoma Press.*

Long, long ago, before Indians came to this valley, a big, big beaver lived in Flathead Lake. I don't know how large he was, but he was so large that no man could have killed him.

At that time, the water did not run out of the south end of the lake as it does now. Instead, it ran out at the west, near Big Arm, where there is now a flat, long valley. If you go over there, you can see where the river used to be.

The big beaver built dams on that river that made the water in the lake deeper and deeper. As he grew bigger and got older, he wanted more and more water. But after a while he decided that he could not build his dams bigger and higher. If he did, the water would run out the south end of the lake. So he swam down to the south end of the lake and there built a dam. He built it slowly and made it wide and high and strong. It went a long way, from the mountains on the east to the mountains on the west. He made it very strong, except in one place. Then the beaver went back and built on the river again. So the water in the lake became deeper and deeper.

By and by, a hard winter came with much snow and deep snow. Then one night a big chinook wind blew, and a warm spring came in a hurry. The snows on the mountains melted fast, the streams rushed into the lake, and the water became bigger and bigger. It was bigger water than the Indians have ever known.

The dam at the south end of the lake, high and long and wide, held the water for a while. But at last it broke in that weak place and the water poured out. As it ran out, it made the hole in the dam wider and deeper. That's the way the Flathead River was made. The beaver built no more, and the river did not change.

If you will go up on a hill above the lake and look, you will see where the water and the land came together long ago before the dam broke. Then go around the lake. At the south end you will see the big dam, from mountain to mountain, except where the water broke through. And near Big Arm you will see the dams, not broken but washed down by water.

The big beaver? I will tell you about him someday. Not now.

Figure 1.7. The river at low water.

Bitterroot

Lewis Revidia

How the Bitterroot Was Planted by the Spirit

It was a time of famine in the land that is now known as the Bitterroot Valley. An old woman, the wife of a medicine man, was grieved because her children were hungry. Without meat or fish, they were slowly starving to death. They had been eating shoots from sun-flower plants, but the only ones left were old and woody. "My sons have no food," mourned the old mother. "Soon all of them will die. I will go to a place where I can weep alone and sing the song of death."

So she went to the stream now called the Little Bitterroot and sat down beside it. There she bowed low until her face touched the ground and her grey hair spread out upon the earth. Bitter tears fell as she sang the song of death.

The Sun coming up over the mountains that over looked the valley, heard the death song. He saw the grieving woman and called to her guardian spirit. "Your child sorrows for her starving people," the Sun Father said to the spirit. "You must go to her. Comfort her with food and with beauty out of dead things."

The guardian spirit took the form of a red bird and flew down to the weeping woman. Softly he spoke to her. "The tears of your sorrow have gone into the soil, and there the roots of a new plant are being formed. The plant will have leaves that are close to the ground. Its blossom will have the rose of my wing feathers and then the white of your hair.

"Your people will dig the root of the plant and eat it. They will find it bitter from your sorrow, but it will be good food for them. They will see the flowers and will say 'Here is the silver of our mother's hair and the rose from the wings of spirit-bird. Our Mother's tears of bitterness have given us food.'"

The creation story of the Bitterroot as related in Char-Koosta, *vol. 3, no. 2 (May 15, 1973), pages 8-9. The author is unknown. Reprinted courtesy of Char-Koosta News, Pablo, Montana.*

spéim
bitterroot

CHAPTER 2

TRIBES, BISON, HOMESTEADERS, AND DAMS

THE FLATHEAD RIVER SINCE 1900

The Flathead River today in some ways appears much as it did in 1900. But look more deeply and you will see evidence of the dramatic changes of the past century— a time of upheaval on the Flathead Reservation and throughout western Montana.

Eighty-four years after the signing of the Treaty of Hellgate — a treaty which guaranteed the sovereignty of the reservation and independence of the Salish, Pend d'Oreille, and Kootenai people — Kerr Dam was completed. It stands today as the product and symbol of how the non-Indian way of life was imposed upon the Flathead Reservation, and of how Indian people have both resisted and participated in the transformation of this once sacred place.

A Brief History of Kerr Dam and the Reservation

An essay by Thompson Smith
based on the script for *The Place of the Falling Waters*
A documentary film by Roy Bigcrane and Thompson Smith
(SKC Media Center and Native Voices Public Television Workshop, 1990)

When Kerr Dam was constructed on the Flathead River in 1938, it brought sudden and dramatic change to a place not only of great natural beauty and power, but also of deep cultural importance to the Confederated Salish and Kootenai Tribes. The dam flooded the falls of the Flathead River, a sacred place known from time immemorial in the Kootenai language as ʾa·knɨ̓ ka·nuk—narrow pass between cliffs—and in the Salish language as stipmétkʷ—falling waters. The dam destroyed one kind of power in order to produce a very different kind—electricity for an industrial economy that was in many ways the antithesis of the tribal way of life. But in coming years, the tribes will have the opportunity to take direct control of the dam and its considerable revenue. And so the question now looms: can something which was part of the assault on traditional native cultures now serve the well-being of the tribal community?

Perhaps some answers may be found in the history of the dam and this place. The following essay on that history is a revised version of the script from the documentary film, *The Place of the Falling Waters*.

Part I: The Road to the Dam

In the beginning, tribal elders tell us, Coyote prepared the world for the human beings who were yet to come. And from that time in the ancient past, beyond all memory and history, Indian people have inhabited the mountains and valleys of what is now western Montana.

The Pend d'Oreille, the Salish, and the Kootenai—each of these three tribes had its own homeland and its own distinctive culture. And for many thousands of years, the people lived well by their traditional ways.

In the tribal worldview, the natural world was more than a collection of "resources" to be used. Everything of the earth was alive with spiritual power, and the people lived upon the land with careful respect.

In the traditional way of life, tribal people moved with the cycles of nature, taking a varied and rich sustenance from the land. It was a boun-

Figure 2.1 Fishing the Lower Flathead around the turn of the century.

Translators

* Joe Antiste quotes translated from Kootenai by Sophie Matt.
** Joe Eneas quotes translated from Salish by Dorothy Felsman.
• Mary Smallsalmon quotes translated from Salish by Dolly Linsebigler.
•• Agnes Vanderburg quotes translated from Salish by Lucy Vanderburg.
° Chief Koostahtah and other quotes translated from Kootenai by Francis Auld.

tiful homeland—from the profusion of bitterroot, camas, and berries, to the great numbers of deer, elk, bison, and other game and waterfowl, to the teeming abundance of fish in the rivers and streams.

That natural bounty was conserved and nurtured over thousands of years by the tribal way of life, in which people lived within the limits of the environment—in part because they lived as tribes, sharing much and owning but little as individuals. Salish elder Agnes Vanderburg (1901-1989) remembered the strong ethic of sharing resources: "when they get meat, they pass it to every tipi, until everybody gets enough for the winter." Kootenai elder Tony Mathias (1922-1996) recalled, "Here [in Elmo-Dayton], it's the same way, down there a long time ago. When you go hunting, and get one, you feed people, you know. That's how come the people used to get something to eat every day. Never get hungry, because they help one another."

At the center of tribal culture was a profound respect for the plants and animals that sustained the people. And that respect, in turn, led the people to live in ways that sustained the plants and animals. As Salish/Nez Perce elder Larry Parker (1914-1995) stated,

> That's why, in the old days, we did have an awful lot of fishes in any kind of a fresh body of water, and the prairies and the woods and everywhere was full of game birds, and wild game animals. That was because we conserved them.....because we were trying to save them for the future.

But through the course of the nineteenth and twentieth centuries, non-Indian people gradually imposed a very different way of life upon the region. During a brief ninety-year span of time, this tribal world of hunters, gatherers, and fishers was displaced by an industrial market economy—a transformation that would ultimately lead to the construction of Kerr Dam on the Lower Flathead River. In many ways, the story of this dam is the story of conflict and exchange between deeply opposing ways of life.

* * * * * * * * *

That ninety-year story can be traced to the Treaty of Hellgate of 1855. U.S. officials, led by Governor Isaac Stevens of Washington Territory, were seeking to confine Indian people throughout the region to reservations, and to take the rest of the land for white settlement. Under the terms of the treaty, tribal leaders ceded 22 million acres of what became western Montana to the United States. They also *reserved from cession* some of their aboriginal lands, including what is now called the Flathead Indian Reservation. On those unceded lands, the U.S. promised the Indians peace and sovereignty, and the perpetual right to live by their traditional ways. In succeeding years, however, the government did not abide by those promises of tribal self-determination. The Treaty of Hellgate of 1855 was a crucial step in the loss of tribal control in western Montana—and in this sense, it can be seen as the first step on the road to Kerr Dam.

Nevertheless, for many years after the treaty, many of the Indian people continued to inhabit their ancestral lands outside the reservation. And for much of the late nineteenth and early twentieth centuries, members of the tribes were able to live largely by their traditional ways. "I could remember them things," Tony Mathias said. "A lot of these old people....they'd go out, and in the summertime they'd get chokecherries, and service berries....bitterroot in the springtime, and.... camas. That's all we used to live on."

The elders interviewed for *The Place of the Falling Waters* were born in the late nineteenth and early twentieth century, and they were raised in a culture that was still far removed from the wage labor and industrialism that would be brought to the Flathead Reservation by Kerr Dam during the 1930's. Their lives were shaped by their tribal connection to one another, and by a powerful spiritual connection to the land. The tribal community was still founded upon traditional cultural values, such as the strict taboo against wasting animals. Salish elder Louise McDonald (1904-1994) emphatically stated that "the people don't waste the meat, them days. They clean the hide, they scrape the hide from the inside the meat. They dry that, they fix it—even the head." "Even the bones," echoed Pend d'Oreille elder John Peter Paul (1909-2001). "The women pound that....cook it. That's where they get this tallow, what they

Figure 2.2 River camp

call it. They never waste anything, those days." "All the people really take care of their deer," continued Mrs. McDonald. "They take care of the bones good—tie it up and hang it up, whatever they not going to use. That's what they do," she said. "That's what I know."

That cultural and spiritual world survived into the lifetimes of those elders—indeed into the present day—in spite of a long and unrelenting history of loss. First came smallpox and other non-native diseases that spread from tribe to tribe across the Americas with utterly devastating consequences. Next came firearms, and then the fur trade, with impacts to native ecosystems and native cultures that we are only now beginning to understand more fully.

Figure 2.3. Spe'm *(bitterroot) harvest. Sophie Moiese, a Salish elder.*

And then came a more explicitly ideological assault on tribal cultures: the Jesuit missionary endeavor, which set root among the Salish people in the Bitterroot Valley in 1841. As John Peter Paul put it, "You know, before—before the priests they call 'Black Robes,'....they pray to the sun or things like that. That's all they lived by, long time ago." But the Jesuits weren't much interested in learning about the native spirituality they were so intent on eradicating. As the Rev. Ignatius Dumbeck, S.J. (1893-1992), who served at the St. Ignatius Mission for decades, forthrightly stated, "Our effort was to instruct them in our faith. And so the Indian faith....we didn't make much effort to learn it. 'Cause we were trying to teach them ....the gospel, and all of that, and our whole effort was in that....direction."

The Jesuits intended to convert Indian people not only to a different set of religious beliefs, but also to a profoundly different mode of subsistence. As Salish scholar Betty White (born 1954) recounted,

> Very shortly after the Jesuits arrived, they became convinced that the only way to convert the Salish was to get them from "wandering around," or "running around," or "chasing the buffalo," in the terms that the Jesuits use, and to have them settle in one spot so that they could teach them Catholicism; but also to....have their culture based on agriculture [and] replace the hunting way of life with an agricultural basis of life.

Many members of the Salish, Pend d'Oreille, and Kootenai tribes resisted not only the Jesuits' demands that they abandon their traditional spiritual practices, but also their insistence that they abandon their tribal ways of hunting and gathering. While it was still feasible for Indian people to hunt, fish, and gather for their subsistence, neither missionaries nor government officials had much success in forcing them to abandon their traditional ways of life. As Larry Parker explained,

> The Indians had no occasion to be hungry at all times because the food was growing in such great quantities in the country. In the old days if an Indian was told, "You'd better start raising cattle and grow your own garden," it would be like telling you to dig a well when there's running mountain water on both sides of your house.

Kootenai elder Joe Antiste (1894-1989) recalled the abundance of native foods as late as the turn of the century:

> The Indian people would go to Libby, around that area, and that's where they hunted a long time ago. They all had horses. They would stay there for about a month.....Three family members would kill over 100 deer. They would return home with a lot of game that was dried. That's what the Indians lived on, meat! *

As Salish-Colville-Spokane elder Joe Eneas (1896-1997) remembered, "It was good a long time ago. When you come home, you have meat tied on—packed on your horse was deer, dry meat!" **

Betty White explained that the Jesuit program constituted a form of "cultural invasion":

> When you determine that your way is superior to another group of people, and you go in, no matter what way, whether it's as a missionary or as a soldier, and you decide that you're going to eradicate someone else's religion or someone else's culture because you deem that yours is superior and theirs is inferior, that's invasion.

Over the course of the late nineteenth and early twentieth centuries, that invasion took many forms, and all of them—even the religious efforts of the Jesuits—were part of the road that led eventually to the construction of Kerr Dam.

Tribal resistance took as many forms as the invasion itself, but during the 1880s, the balance of power shifted decisively in western Montana. The completion of the Northern Pacific Railroad in 1883 suddenly enabled the industrial development of the region. In the last decades of the nineteenth century, the lands, forests, and waters of Salish, Pend d'Oreille, and Kootenai aboriginal territory were exploited on a scale never seen before. Logs, crops, and livestock, and especially ore could now be seen and exploited as commodities, for the railroad provided a means to ship them to national and international markets. Non-Indian farmers, ranchers, and miners poured into the region.

As a result of this economic revolution, tribal people were faced with a newly restricted resource base. An increasing number of Indian families finally began to turn to agriculture and subsistence gardening to supplement—but not replace—their traditional ways of hunting, fishing, and gathering. Pend d'Oreille elder Mary Smallsalmon (1909-1995) remembered the garden her father raised and the mix of wild and domestic foods in the family diet:

> About the food, we had a garden, a big garden. My Dad planted a garden—potatoes, beans, corn, carrots, cantelope, watermelon, squash. All this was in my Dad's garden at Crow Creek, where we had our house. We had a big garden.....I said us Indians, we were poor. But we were not really poor—we had gardens, we had deer meat, and we make deer dry meat. My father's mother, my brother Peter, they would make deer dry meat. •

During this same period, most tribal people who had continued to live on ancestral lands outside of the Flathead Reservation were now forced to move. The Hellgate Treaty of 1855 had left the Bitterroot Valley in an ambiguous status, and over the following 35 years, the majority of the Salish had fiercely but non-violently resisted intense pressures for them to leave their beloved homeland. In October 1891, however, the government finally forced the tribe to march north to the Flathead in what has been called Montana's Trail of Tears.

Yet once the Salish had moved to the Flathead Reservation, they began to rebuild a stable life for themselves, along with the Pend d'Oreille and Kootenai who were already there. Tribal people not only blended subsistence agriculture with hunting, fishing, and gathering, as we have seen, but they also maintained, and in some ways reinvigorated, the community support systems and extended family networks that lay at the heart of tribal life.

Native people, in short, were being forced to alter their lives, but they had not yet lost all control over the pace and direction of change. As former Salish Kootenai College instructor Ron Therriault (born 1931) observed,

> The tribal people that had taken to farming were doing pretty well for themselves. They had nice farms, they good workable land, and they also had the promise of the irrigation system, and all of this lent to success as such—not a corporate-type success, but individually, a number of the tribal people were doing well.

At the same time, however, now that many of the Indian people were living in towns or on farms or ranches, the Catholic church was beginning to exert a much stronger influence. Enormous boarding schools were built around the town of St. Ignatius, and children were required to attend by the U.S. Indian agents, by the priests, and, increasingly, by the Indian parents themselves. The Rev. Ignatius Dumbeck explained the Jesuits insistence on having mostly boarding students:

> Well, see...most our schools were boarding schools....there were very few "day scholars," because....one of the main things is that they must learn to talk the English language. And if they're living at home, why, they're talking Indian all the time.

Rev. Dumbeck expressed regret that tribal people "quit talking Indian," even as he also bluntly described the Jesuit strategy (which he helped implement as a priest) of getting the older students to "help change the mentality of the [younger] students, their playmates" to get them "oriented . . . to the white man's ways."

In the increasingly complicated mix of ways of life and cultural worldviews on the Flathead Reservation, the experiences of elders in the boarding schools was mixed. Pend d'Oreille elder Margaret Finley (1926-2005) recalled, "I learned lots from

Figure 2.4 Kerr Dam.

them. I learned how to cook, I learned how to do things....in the white man's world." Yet others recalled the more painful aspects of the boarding school environment, where children were punished for speaking their native languages. Larry Parker said,

> Well, that sure put a hardship on my schooling there, because I did not know a word of English. It would be just like you going to China or Russia or somewhere and attending school there, and not knowing your language at all. You'd be completely lost.

Agnes Vanderburg remembered that "When we would get together and talk our language, we would have to stand in the corner. The Blackrobes would tell us, 'Do not talk your language.' Sometimes they would make us stand up together and they would spank us." ••

Mrs. Vanderburg then said that in her view, the now-deceased priests were "all down below now." She said it with a laugh and a twinkle in her eye, but for a deeply religious elder to speak this way of priests is an extraordinary reflection of the depth of pain caused by the Jesuits' actions. Mrs. Vanderburg blamed the dramatic decline of fluent speakers of Salish on the boarding school experience, saying, "That's why the ones who were growing up quit talking our language."

The turn of the century was a time of great pressures upon the people here. Epidemics of European diseases continued to sweep through the area, taking heavy tolls among tribal elders. People were harassed and even killed for hunting off the reservation, even though this right was guaranteed by treaty. Official government policies had already been in place for decades that literally outlawed the public practice of important cultural activities. In 1885, U.S. officials established the "Rules Governing the Court of Indian Offenses," enforced by a new penal system of Indian police and judges, that banned most aspects of traditional culture, including dances and feasts, traditional healing and medicine, gambling, burning grasslands and brush to manage the land, engaging in plural marriage or unmarried cohabitation, resisting the enrollment of children in the Jesuit boarding schools, or in other ways refusing to "abandon their heathenish rites and customs." Violators were often subjected to lengthy imprisonment.

At the same time, pressures were also mounting outside the reservation, where non-Indians were beginning to control increasing portions of Salish, Pend d'Oreille, and Kootenai aboriginal territories. In time, they began to eye lands within the Flathead Reservation itself—despite the Hellgate Treaty's seemingly iron-clad guarantee that in exchange for the cession of 22 million acres of their aboriginal territories, the reservation would be set aside for the tribes' "exclusive use and benefit." As Ron Therriault explained,

> As time passed, the non-Indian even became aggressive over the existence of the reservation.... they would look up and say... "Look at all that wonderful farming land, and here's all these Indians up here, and they don't know what to do with it." And so there became a movement, an attitude of the settlers that "that was an awful waste of land, we should be getting that reservation. It should be opened for settlement, so some good use could be made of the land."

The tool for accomplishing that objective was the General Allotment Act, passed by Congress in 1887 with the aim of forcing cultural change on Indian reservations by dismantling collective tribal ownership of land. The act called for Indian agents to draw up official "rolls" of tribal members, allot a certain number of acres to each single adult or head of a household, and then declare any remaining lands within the reservation "surplus" and open those lands to non-Indian settlers. In the history of Indian-white relations in the United States, no act by Congress had a more devastating impact on the well-being of Indian people.

While the General Allotment Act was passed in 1887, specific acts then had to then be passed for each reservation. This was because each reservation was established by a specific treaty with specific language relating to the disposition of lands. For many years, it seemed the Flathead Reservation would never be allotted. The treaty said that allotments of land would be designated only for those tribal members who requested to be allotted, and it was clear that an overwhelming majority of tribal members desired no such thing.

But in 1904, Representative Joseph Dixon, a Missoula businessman who had been elected to Congress on the promise of making the "opening" of the Flathead a top priority, found a legal loophole and got the Flathead Allotment Act passed. President Theodore Roosevelt signed the bill into law. On the Flathead Reservation, communal ownership of the land—the basis of the tribal

Figure 2.5. A death feast or giveaway on the Lower Flathead's largest tributary, the Jocko River.

economic, cultural, and social system—would be brought to an end. The government allotted individual tracts to individual tribal members, declared much of the remaining land "surplus," and threw those lands open to settlement by non-Indian homesteaders.

Referring to the division of land into square-mile sections, Kootenai elder Adeline Mathias (1910-2007) said, "They call it 'making checkers' —meaning that they started cutting the reservations."

Many Indian people were left in the dark about what was happening. Joe Antiste recalled that "The President said for the Indians to take eighty acres or forty acres for their own land. A letter came telling this to all the Indians. All the Indians went crazy. They didn't know what was going to happen to them. And me, I didn't know." *

The U.S. Indian Agents gave many people allotments on lands that were unfamiliar to them, and which were useless for farming or traditional modes of subsistence. "In Pablo, about a mile and a half [from there], that's where my land is," Mr. Antiste said. "That's where they put me. I went over there—I looked at the land, and all there was, was rocks." *

In April of 1910, the gates were opened and non-Indian settlers flooded onto the Flathead Reservation at a staggering pace. "They didn't no more than open the reservation, and boy, you talk about the immigrants coming in," remembered Salish elder Bazile Peche (1903-1993). "Horse, horse and wagon, buggies, some pack horses." Salish-Nez Perce elder Charlie McDonald (1898-1995) recalled how

> You'd go out to Charlo, in that country on horseback. When you would be coming home late in the evening, hell, maybe the roads, the trail you took going out, when you're coming back, you couldn't go on it. There'd be a wire fence and a shack there —it would be a homesteader pulled in there to set up his homestead outfit.

Both before and after the opening of the reservation, tribal members and delegations of leaders traveled to Washington to protest the violation of the treaty, but their pleas were ignored. The Indian people of the Flathead Reservation were unaccustomed to both market agriculture and private property, and they became easy targets for those non-Indians who had long coveted their land. As Ron Therriault observed,

> When you come to the concept of ownership of land, it was something new to the Indian. Whereas with the European, that ownership concept is well embedded in their society. So as they came in contact with the Indian, they were well practiced in the ways of getting land, claiming land, and holding it; and the Indian was not prepared for this.

Schemes quickly arose to take Indian land and make a profit in the process. William Smead, who had served as U.S. Indian Agent on the Flathead Reservation from 1898 until his dismissal in 1904, used his inside knowledge to found the Flathead Land and Information Agency in Missoula, helping settlers gain title to prime tracts on the reservation. Joe Antiste recalled how easily tribal people were preyed upon, and how abandoned they felt by their supposed governmental "guardians":

> The President, he knew good and well we got nothing, we got no plow or anything. We didn't have anything. He knows that we have lots of kids, and then the white people are coming. He says, "You sell your land, you sell your land." Eighty acres—just like that—no more land! *

The Flathead Allotment Act transformed the reservation, and the impacts were felt in every facet of tribal life and culture. As Larry Parker related, the explosion of farming, ranching, fences, and the delineation of private property within the reservation harmed the ability of people to gather their traditional foods:

Figure 2.6 Kerr Dam worker.

> A lot of the lands where the wild food grew, you see those lands were sold to the whites by the government....they homesteaded there. And of course, if Indians went up there, they'd say, "Could we pick some fruits which are....on your land?" If the man was mean, he'd say, "You go to Hell! You get it elsewhere—this is private property!" But if the man was kind enough, he'd say, "Yeah, go ahead," and then they'd dig. [But] then, after a while, wherever the wild food grew, then it was plowed up; then that would kill off those wild foods. There'd be none left.

The sudden influx of non-Indians resulted in a profound marginalization of tribal people within their own reservation. Tony Incashola (born 1946), now Director of the Salish-Pend

d'Oreille Culture Committee, recalled this sense of disempowerment:

> My grandparents, my parents always felt like they didn't belong in certain parts of town, when in reality this was *their* land. This was *their* home first, before anybody's. They are not the visitors; they are the residents of this area. But they were made to *feel* like visitors.

Of all the assaults on tribal culture and tribal sovereignty that eventually led to the Montana Power Company's construction of Kerr Dam, none was more important than the allotment act. Joe Antiste summed up the law in simple but devastating terms: "That's government, that's its job—we got no more land."

In the half century after the Treaty of Hellgate of 1855, the people of the Pend d'Oreille, Salish, and Kootenai tribes had journeyed through worlds of change. The allotment act, combined with the other pressures we have seen, in many ways subverted the promise of cultural coexistence held out by the treaty. Less than three decades later the invasion of the Flathead Indian Reservation would culminate in the construction of Kerr Dam. Yet as we will see in Part II, through all this, the people still maintained their ancient cultures, still survived—and still fought back.

Figure 2.7 Kerr Dam workers. L to R, Louie Nimepipe, Eneas Inmee. Identifications of Figures 2.7 through 2.16 courtesy of Felicite Sapiel McDonald.

Part II: The Road to the Dam

In 1855, a treaty between tribal leaders and U.S. officials established the Flathead Indian Reservation in what is now the northwestern corner of the state of Montana. For the native people, the treaty represented a promise of peace, and a guarantee that they would be able to continue to live by their traditional tribal ways.

But throughout the nineteenth century, U.S. officials consistently sought to weaken the treaty, to avoid meeting its obligations, to undermine rather than defend the independence of the native peoples.

The tribal ways of life and the non-Indian cultures that were now being imposed upon the region differed in profound ways: their spiritual traditions, their economic systems, the ways these societies were organized, the ways they interacted with the environment, their forms of artistic expression, their ways of seeing and understanding the world. In virtually every way, these were profoundly differing ways of life. Throughout the nineteenth and early twentieth centuries, a complicated history unfolded of conflict and exchange between these deeply opposing cultures. Through many twists and turns, it is a story we can follow to the construction of Kerr Dam on the Lower Flathead River in the 1930s.

During the early decades after the Hellgate Treaty, the Pend d'Oreille, Salish, and Kootenai tribes did manage to exert a measure of control over the changes that were imposed upon their people and their lands.

But then, in the mid-1880s, railroads were completed that connected western Montana and its natural resources to the outside world. From that time on, it became much more difficult for tribal people to oppose the taking of their resources, to shape the kind of society that was emerging in Montana, to slow or stop the devastation of the environment. It was no coincidence that the forced removal of the Salish people from the Bitterroot Valley to the Flathead Reservation happened in the immediate aftermath of the completion of the Missoula & Bitterroot Valley Railroad, a spur line off of the Northern Pacific Railroad that ran through many Salish landholdings.

But even after the railroads were built, the Flathead Reservation remained, in at least some ways, a sanctuary for tribal people. The treaty had set aside the reservation for the tribes' "exclusive use and benefit." The only non-Indians who could live there legally were government employees, missionaries allowed on the reservation by the tribes and the government, licensed "Indian traders" operating stores at various places on the reservation, or non-Indians who were married to tribal members.

But all of that changed with the Flathead Allotment Act in 1904, which Congress passed despite overwhelming opposition from tribal members. Authored by Montana Representative Joseph Dixon, the act broke the back of the independent tribal economy. In 1971, the U.S. Court of Claims would belatedly declare that it constituted a fun-

damental "breach" of the Hellgate Treaty. Under the terms of the act, Congress ended communal ownership of land by "allotting" parcels of land to individual tribal members and thereby forcing them to become owners of private property. The act then declared unallotted land to be "surplus," and in 1910, threw many of those lands open to non-Indian homesteaders. Almost overnight, non-Indians outnumbered Indians within the reservation. More than that, non-Indians increasingly controlled the economic and political landscape. One revealing measure of the change could be seen in the stores on the reservation. Where many of the old licensed Indian traders had to learn Salish or Kootenai (or both) in order to conduct business, now tribal people had to learn English in order to function in the new economic, social, and cultural world. The balance of power, in language and in the economy, had flipped.

Figure 2.8 Plasi *Cocowee.*

All of these changes were part of the larger transformations that would culminate in the construction of Kerr Dam a quarter century later. From the opening of the reservation in 1910 until the completion of the dam in 1939, the road was steep and fast.

* * * * * * * * * *

The allotment act might not have destroyed the tribal economic system by itself. But in 1908, Congressman Dixon pushed through yet another bill, which provided for the construction of a massive irrigation system on the reservation. The Flathead Indian Irrigation Project would bring water to about 150,000 acres of dry lands.

The government's official rationale was that the project would help Indians become farmers. But as former Tribal Council Member Teresa Wall-McDonald (born 1954) said,

> The irrigation project was originally designed to benefit Indians, and to serve Indian allotments, but when the reservation was opened, many non-Indians acquired the allotments; and so in the early years, you had a Bureau of Indian Affairs (BIA)-authorized project serving non-Indians on the reservation.

In effect, the irrigation project only accelerated the allotment act's transfer of Indian lands into non-Indian ownership.

When the irrigation proposal was brought to the attention of tribal members, the reaction of many was at first positive. By 1908, large numbers of Indian people on the Flathead Reservation had been gardening for decades, supplementing traditional foods with vegetables, and other domestic foods raised in small plots. Many tribal gardeners built small-scale irrigation ditches to water those gardens. Now it seemed the government was simply offering to help these tribal gardens by providing more water. As Salish elder Agnes Vanderburg (1901-1989) remembered,

> In order to get the irrigation ditches, they told the Indians, "If we build the ditch, there will be a lot of water for your gardens. If you plant potatoes, you'll have water."
>
> And the Indians thought, "Yes, that would be all right." ••

In many places, the government built their new, much larger canals directly over the preexisting Indian ditches. But the officials never told tribal people that they would then be charged for the cost of building and maintaining the ditches, and for the cost of the whole project. "The white people built the ditches," Mrs. Vanderburg recalled, "but when they finished, *then* they said they needed to be paid."•• At that time, many Indian people lived almost entirely outside the cash economy, so they had virtually no money with which to pay the sudden charges levied by the government. Their only significant "asset" was their land, and agents now began foreclosing on tribal people who could not pay for the ditches that had been run through their lands. Teresa Wall-McDonald noted that the government "acquired allotments through foreclosure where tribal members owed the irrigation project for water [that had been] delivered [to their allotted lands]." In other cases, licensed Indian traders, who had traditionally granted tribal members credit at their stores, suddenly called in their debts and took Indian allotments as payment. As Ms. Wall-McDonald said, "[the] Beckwith [store in St. Ignatius] ended up acquiring many of the Indian allotments for an eighty dollar debt at the store."

There were many other ways in which tribal members lost control of their allotments. The total impact was staggering. Between 1910 and

1929, over 409,000 acres of Flathead Reservation lands—primarily the limited high quality agricultural lands—were put into white ownership. And during that same period, an additional 131,000 acres of Indian allotments were lost to non-Indian ownership.

Ms. Wall-McDonald recounted the apparent corruption that also surrounded the project:

> During the initial construction of the irrigation project, the materials used to build the ditches were purchased at Missoula Mercantile and Beckwith Mercantile in St. Ignatius. Joe Dixon, who produced the legislation to open the reservation, had an interest in the Missoula Mercantile. He also owned property on the reservation.

Agnes Vanderburg, reflecting on how the irrigation project and other schemes were sold to tribal people, said to her it seemed that "The white people just came here to lie." ••

Many traditional people shared Mrs. Vanderburg's anger over allotment, the irrigation project, and the non-Indian takeover of the reservation. As Mrs. Vanderburg remembered, Sam Resurrection, a Salish elder who often led protests against government policies, resorted to direct action in an attempt to stop the course of events:

> They did not like the water [i.e., the irrigation project]. One person tried to stop it....they would survey where the water would be going into the ditch. They would put a stake in the ground. This old person would take out the stakes and burn them. He thought that would stop them. So they didn't survey it, and they made the ditches anyway.••

Much of the Flathead Reservation is characterized by palouse prairie streams, which carry clear cold water from the Mission Mountains and other ranges through otherwise dry grasslands to the Flathead River. The irrigation project harnessed all or part of many of these natural stream flows, redirecting them with a network of dams and canals. The project profoundly changed natural water tables of the valley—in some places ruining preexisting Indian gardens, in other places devastating fisheries, and nearly everywhere bringing a reduction in natural water flows. "Just like Mission Creek right here is a good example," recalled Salish-Nez Perce elder Charlie McDonald (1898-1995). "[W]hen I was a young feller here, all along up and down here there was swimming holes for any kid that wanted it. Now you'd have a hell of a time finding a swimming hole. And I used to catch a lot of nice big fish out of there."

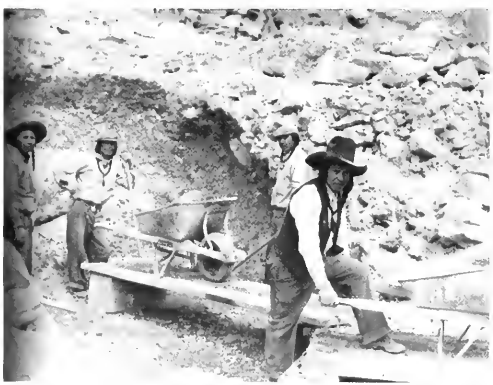


Figure 2.9. L to R: Plast Covowee, Baptiste Pierre (killed during construction of the dam), Eneas Inmee, Louie Ninepipe

As we saw above in Agnes Vanderburg's account, the project was pitched to tribal people as helping their small agricultural operations. But in reality, because most Indian gardens were located near streams, as the project reduced the in-stream flows, it also ended up drying out many of the gardens. "I know before the canals were put in, God, you could put a garden out there—you didn't need to water," remembered Pend d'Oreille elder John Peter Paul (1909-2001). "But when they put the canals in, it kind of shut off."

In effect, if not in intention, the irrigation project, like the allotment act and the opening of the reservation to white settlement, was part of the destruction of the reservation's tribal economic system. Until the early twentieth century here, Indian people had maintained complex networks of communal interdependence, a mix of subsistence gardening and ranching with traditional hunting, gathering, and fishing. Many elders recalled a time when their involvement with the cash economy—with the market system—was still very limited. Pend d'Oreille elder Mary Smallsalmon (1909-1995) recalled, "A long time ago when I was young—I was about seventeen years old—we did not go to a grocery store." * And Agnes Vanderburg, who was born in 1901, remembered that it wasn't until she was "about six or seven...when my folks started buying stuff." And even then, Mrs. Vanderburg said, "they didn't buy a whole lot—they just buy what they really need, you know." She said that her family—one of the more traditional families on the reservation—continued to depend primarily on the foods taken directly from the land: "still we had our own food." **

That tribal economy of gift-giving, of communal hunting and gathering, of yearly cycles of life centered around a rich spiritual calendar, continued to be practiced. But gradually, that system was being displaced as the dominant way of life by a very different order. As the traditional way of life was marginalized by the effects of allotment, irrigation, homesteading, and other factors, Indian people here were being forced into the cash economy. Except for the few with the means to conduct market farming or ranching, tribal members now had to get wage-earning jobs in order to survive.

But in part because of depressed economic conditions and in part because of racial discrimination and cultural barriers, it was difficult for tribal people to find work in this new and alien economic system. And as more young men left the area seeking work, the result was a further splintering of the once close-knit tribal community. "When I was young, I never stuck around on this reservation much," recalled Salish elder Bazile Peche (1903-1993). "I was looking for a job someplace. Go down to Yakima and around there, and the first job I ever hit was down there—I was picking hops. I tell you, you had to pick a lot of hops to make any money." Many tribal families traveled together for seasonal work picking berries and fruit, often in old tribal territories such as the Bitterroot Valley.

Those who stayed on the reservation during these years saw a depth and extent of poverty unknown in earlier times. Many elders relate stories of the extreme conditions of the decades after the opening of the reservation. Salish-Kootenai elder Agnes Kenmille (born 1916) remembered a time when she was a little girl and her mother was too ill even to cook for her children, and so Agnes tried to cook something. Mrs. Kenmille chuckled as she remembered throwing flour into a coffee can full of boiling water, stirring it up and adding a little salt. "Ahhh, it looked ugly," she laughed. But she suddenly turned serious as she said, "Well, it helped—I was starving." Salish-Nez Perce elder Larry Parker (1914-1995) related the conditions in his home:

> We were so dang poor at home that whenever my folks would hear that some farmer's cow died, when he was within the radius of a mile or two or three.... Then my folks would go there and skin it, and they'd take that stinking meat back home, and they'd cure it, and it was edible to some degree. But in my case, I would never eat it—because I could still smell that smelly meat. Oof! It was awful for me.

Mr. Parker recalled what he called the "forced hunger" of that time, saying, "You've probably heard of the gnawing pains of hunger. Well, that's how it feels. It hurts."

The erosion of the tribal economy, and dependency on the cash economy, had brought poverty to the Salish and Kootenai people; and this poverty, in turn, led them to dependency on the government dole. "Everybody started getting 'rations,' they call it," said John Peter Paul. In most cases, what little was provided to tribal people was the cast-offs of the dominant society, such as low-quality foods that over time contributed to the chronic health problems that began appearing in the tribal population during the twentieth century. Both Mr. Paul and Kootenai elder Joe Antiste (1894-1989) remembered the enormous slabs of salty bacon that were provided to tribal members in need. "They gave a slab of bacon about that big," said Mr. Antiste, with his hands held out at shoulder width. "Bacon, beans, all kinds of stuffs. They went after it—Chief Koostahtah never brought it. Somebody would go after it [for him]. He can't eat that bacon, they couldn't eat it. Too much salt! They used it for fire, making firewood. Those Indians all used it."*

Figure 2.10 I left sitting. Sakali Finley

Mr. Antiste's remarks suggest the indignity felt by many people in taking alms from the government. Out of a sense of tribal honor, chiefs would never go to the commissary.

Although non-Indian poverty was not generally as severe as that experienced by many tribal people, during the 1920s there was a severe and widespread depression settling across much of rural America, particularly in the West. By that time, many of the white farmers who had homesteaded on the Flathead Reservation were themselves facing economic ruin. And this

meant financial problems for the Bureau of Indian Affairs' massive Flathead Irrigation Project. The farmers who were supposed to pay for the project were going broke. Teresa Wall-McDonald explained,

> In the original design of the irrigation project, the people who benefited from the project were supposed to pay for the debt of constructing the ditches to their land. In 1926 or 1928, there was a five-million dollar debt owing on the irrigation project. [Congressman] Louis Crampton's Interior Committee was reevaluating whether or not they wanted to invest any additional funds into the project.

Even as pressure was increasing for the Flathead Indian Irrigation Project to address its financial problems, private interests were eyeing yet another reservation resource. The Montana Power Company and its corporate twin, the Anaconda Copper Mining Company, were evaluating the falls of the Flathead River, just below Flathead Lake, as a possible site for a hydroelectric facility.

Figure 2.11 Kerr Dam workers. On left, Sakah Finley

During the first half of the twentieth century, Anaconda dominated Montana's economy and its political system to a degree perhaps unmatched by any other corporation in any other state in American history. Butte had long since been established as "the richest hill on earth," and at nearby Anaconda, the tallest smokestack in the world turned the ore from Butte into copper and other pure metals. The two cities had already turned much of Montana into a vast hinterland feeding resources to their industrial operations. As early as the 1880s, Anaconda was consuming 40,000 board feet of timber per day from the forests of western Montana. The vast logging mill at Bonner, the hydroelectric facilities at Great Falls, countless farms and ranches, and many other aspects of Montana's economy were keyed around supplying Anaconda, Montana Power, and the burgeoning urban population of Butte.

Now, Anaconda's mining and smelting operations were demanding new sources of electric power. At the falls on the Lower Flathead River, an enormous and dependable volume of clean water rushed through a narrow rock-walled canyon after issuing from Flathead Lake (the largest freshwater lake in the western United States) and a drainage system that included the western half of Glacier National Park. Engineers in both the public and private sectors had long seen this place as one of the most valuable potential dam sites in the entire state. Now Anaconda and Montana Power came together to form a jointly owned subsidiary called Rocky Mountain Power, which submitted an application to the Federal Power Commission to build a dam at the site.

For many tribal people, however, this was a place of power of an entirely different kind. For them it was a sacred place, a place to be respected, a place where human beings should be humbled rather than heedlessly exerting their ability to transform and destroy the natural world. At this place, the long history of conflict and exchange between two deeply differing cultures and ways of life came into sharp relief.

In interviews for *The Place of the Falling Waters*, tribal elders strike a delicate balance between communicating in a general way the deep cultural importance of this place, and honoring the need to keep their spiritual traditions private. Agnes Vanderburg said simply, "My husband [Jerome Vanderburg] was still young....it didn't fall into his head [occur to him] to go work up there. He kind of disliked the dam. That isn't the kind of work he did. He didn't want it." •• John Peter Paul said only, "They figured it was sacred —there, the fishing, all of that." Kootenai elder Tony Mathias (1922-1996) echoed Mr. Paul in stating the spiritual importance of the place, but leaving it at that: "Well, some of them didn't like it [the dam], because that was....where the spirits is at." Kootenai elder Alec Lefthand (1913-1996) said, "Before the dam was built....somehow the [Kootenai] people heard....that people wants to lease this place to build a dam. And....something told my people not to let it go, because it's very important to the Kootenais."

But the cultural and spiritual life of the people—strong even after eighty years of attacks — was of little concern to the government. Ignoring all questions of tribal culture and tribal sovereignty, the Bureau of Indian Affairs merely saw the dam as a way to clear the debt on the still uncompleted Flathead Indian Irrigation Project. As Teresa Wall-McDonald recounted,

> The funding of the completion of the irrigation project was Kerr Dam. Rocky Mountain Power or Montana Power came in and said that if the local people would relinquish the damsite to them, that they would build a bigger dam, give the local residents a low-cost block of power—the residents could retail the electricity on the reservation, make a profit, and use that to pay back the government the [irrigation project's] five-million dollar debt.

To the BIA, this seemed like a perfect solution at the perfect time. Under the terms that began to take shape during the late 1920s, none of the money from the dam would go to the tribes; rather, it would be divided between the power company, the BIA, and the irrigation project and its mostly non-Indian water users. BIA officials were not even planning to require the power company to pay the tribes for the land on which the dam would be built. As Ms. Wall-McDonald put it:

> In the beginning, when the Montana Power Company was pursuing the license, nobody protected the tribes' interests adequately. It was a tribal resource; it was tribal property; those were tribal waters that were reserved for the benefit of the tribe in the beginning of the reservation. The Bureau of Indian Affairs and congressional officials completely ignored that fact. Instead, they advocated the turnover of the damsite to the Montana Power Company. They did little or nothing to protect the tribes' interests. It was a shameful process.

During this era, the tribes had no clear way to press their concerns to the federal government. The traditional chiefs were regarded with condescension and dismissal by officials in Washington. Meanwhile, competing groups laid claim to being the true tribal government. During the 1910s, the BIA had set up a "Flathead Business Council," comprised mostly of non-traditional tribal members who had no deep cultural objections to large-scale resource extraction on the reservation, such as the massive logging of old-growth timber that ravaged tribal lands through the 1920s. Another group formed a quasi-democratic "Flathead Tribal Council," which often was at odds with the business council but which was not clearly recognized by federal officials. When the Flathead Tribal Council tried to allocate funds for a lawyer to defend their rights regarding the Flathead River power site, the Secretary of the Interior exercised his power of approval over tribal expenditures and flatly blocked the appropriation.

Some tribal members took up their own means of resistance to the pending deal. Teresa Wall-McDonald told how "when Montana Power was doing core drillings at the site, a group of tribal members on horseback with rifles went out there and chased the officials off the site and sat watch and guarded the site."

Word of the project quickly made its way to national Indian advocacy groups such as the American Indian Defense Association, led by the famed reformer John Collier, who in 1933 would become Franklin Roosevelt's Commissioner of Indian Affairs. Articles about the pending deal with Montana Power erupted on the pages of *The Nation* and other magazines, and the uproar forced the BIA to revise the terms of the deal. In the end, the Federal Power Commission required the power company to pay the tribes an annual rental fee of $140,000 for the use of the damsite, with that fee to be renegotiated periodically. The company was also required to give job preference to tribal members during construction of the dam.

Figure 2.12 "Mucking" or clearing blast debris, Kerr Dam

In May 1930, the BIA arranged for Montana Power officials to conduct public events on the reservation to try and garner support from tribal members for a project that few if any truly understood. Teresa Wall-McDonald told how "Some of the elders talk about a powwow where Rocky Mountain Power or Montana Power officials came in, and gave everybody money at the powwow if they were to sign a petition supporting the licensing of the dam to them." Kootenai elder Adeline Mathias (1910-2007) vividly remembered the gathering and the actions of Montana Power President Frank M. Kerr (1869-1940):

> And Mr. Kerr bought all the groceries for the Indians that were camping out. He was so generous and nice because he wanted to build that dam. He even hand out cash to the chiefs! I seen that, and I knew that—for the chiefs to take care of their people with while they were camping out. That's how much he wanted the dam, the falls so he could build the dam. He was pretty loose with his money!

Following the meeting in St. Ignatius, tribal members, Kerr, government officials, and other interested non-Indians traveled to the falls of the Flathead River. During research for *The Place of the Falling Waters*, newsreel footage was discovered of the government-scripted event at the falls. Remarkably, the soundtrack survived, and we can both see and hear the falls—and excerpts from some of the speeches. Mr. Kerr, reading from notes he held in his hat, told the assembled group, "It is a great pleasure for me to meet you and your people today in your homeland, at this place of falling waters, where water has fallen idly for ages—the gift of our great Creator."

Mr. Kerr, of course, had in mind putting the "idle" water to what he considered good use. But to many tribal people, the water was already serving a far greater purpose than what the non-Indians had in mind.

The company, as we will see in Part III, promised tribal members free electricity for allowing them to build the dam. Even that was a miserly payment for such a lucrative resource, but with the BIA arrayed on the side of Montana Power, there was little the chiefs could do except remind the white men of their moral obligation. The Kootenai Head Chief, Koostahtah (1891-1942), told the assembled crowd: "....this man [Kerr]....I know that today, he has a big name in this country. Today, I give him an even bigger name, this area. I know he has wealth. Today, I'm giving him even more wealth, this man." [9]

Figure 2.13. Kerr Dam dedication. Second from left, Mathias. Fourth from left, Chief Martin Charlo. Fifth from left, Chief Koostahtah. Sixth from left, Victor Vanderburg. Seventh from left, Frank Kerr.

Within the conventions of tribal gift-giving traditions, Chief Koostahtah was sending Kerr a clear message: *we here today, the impoverished, are enriching the rich; you now owe us.* The chief's very public statement of obligation, however, seems to have been lost on the non-Indian visitors. Mr. Kerr, almost comically echoing the broken promises of the past, told the Indian people, "I hope the work will be a success, and bring to your people many comforts—as long as water falls." The newsreels trumpeted the meeting as a willing and enthusiastic agreement: "Big Chiefs Help Flathead Project / F.M. Kerr, Gen'l Manager of Montana Power Co., enlists co-operation of Koostahtah and Charlo."

The project was postponed during the severe financial downturn during the height of the Great Depression. When construction finally resumed in earnest in 1936, hundreds of Indian men did help build the dam, in spite of the sacred nature of the place. By that time, as we have seen, the independent tribal economy had been largely broken as a direct result of federal policies, including the Flathead Allotment Act and the various laws establishing the Flathead Indian Irrigation Project. The traditional sources of food and support had been reduced, and many Indian people had become poor, and dependent on the cash economy and rations for survival. So for many people, the sudden chance to earn good wages loomed even larger than their cultural and

spiritual objections to the dam. Salish-Colville-Spokane elder Joe Eneas (1896-1997) cheerfully recalled getting such high-paying work: "Maybe it was forty-five cents that we received per hour. [Laughs] It was good! Later they raised it to fifty cents. [Laughs] Fifty cents is what we were paid for one hour of work. It was good! [Laughs]" **

Mary Smallsalmon brightly told of her brother, Pete Beaverhead, working at the dam: "My brother worked over there—makes good money that time…He bought a wagon with tires, team of horses, harness—good stuff." •

For many of the Indian workers, it was their first experience in industrial labor. The company assigned most of them to manual jobs, while whites occupied most of the skilled positions. Unions were explicitly prevented from organizing at the work site, a provision agreed to and enforced by the tribes themselves. "Once in a while," said John Peter Paul, "they would do double shifts. The deal was….if your relief doesn't come, you got to stay there. Then if the *other* guy doesn't come, you still got to stay another eight hours. Of course, that paid pretty good."

Joe Eneas told of his job at the site:

> In the year of 1937, I went to work at the dam. The work I did was called "mucking" [i.e., cleaning]—that's what I did. And I don't know how long I did this. Right where they were going to build the dam, that's where I was cleaning. [Gestures] And the rocks from the cliff, that's what we were cleaning. **

Due in part to the absence of unions, there were few safety precautions, especially in the early stages of construction. And as tribal workers with hand tools and wheelbarrows continued to clear away the dam site beneath the towering walls of rock, it became clear to many that a serious accident could occur. Alec Lefthand said

> They know it was going have a big slide there, but they still send boys to go in there and work. And….everything…just didn't run right, because white people didn't care about it, [because] it was run by Indians and….that's why a lot of 'em got killed there.

In 1937, this carelessness led to the deaths of five tribal members. Two died in a rock slide in March, and three perished in a cave-in in September. Alec Lefthand spoke of the night before one of the accidents:

> One old man told me…..when he got back to his camp—he told his old lady, "Something's going to happen tonight…..Because that rock is moving—when I last looked at it before I left, it moved about a foot." And that night, that's when it happened.

Joe Eneas told of the same fateful night:

> I don't know what time of night it was—it had been raining, and they were working there. The cliff was high, and they were working below, and the rocks broke off. [Gestures] Some were killed. I don't remember how many were killed there.
>
> I lived only because I was not there. I was not with them. **

Mr. Lefthand told of how the violation of the falls exacted a terrible price on the Kootenai people:

> And before I started working here, we lost Chief Mathias's son. About 100 yards from here [the site of the interview], that's where he was working and got killed on the landslide. Couple people got killed there, and a few others got caught in that slide….we lost them. That's what….that "something" say, why they don't want to let this place go. It cost us the chief's son.
>
> We lost the chief's son here.

Figure 2.14 Kerr Dam dedication. Left (upper) row, L to R unknown, Snayaqn Queqnesah, Louie Combs (edge of face showing), Čnšisu (Little Martin), uncertain, Baptiste Telpah (with headband), unknown, unknown. Pečum Finley (next to last in row, face visible), uncertain (white headdress).
Right (lower) row, L to R Ła'kat (Agate Ogden Finley), unknown, unknown, Kootenai woman married to Salish man (her face is turned partly toward camera), unknown Mary Ann Combs (with handkerchief on head at end of row)

John Peter Paul related how, only after these accidents occurred, did the company seem to make some cold calculations that they should be more careful:

> They were a little careless...I think they were told if ten people got killed, they were going to lose their contract. Right now, *nine* got killed. They were pretty careful from there on. They had brought safety men. They wear [hard]hats. All they would do is go around.

Eighty-four years after the signing of the Treaty of Hellgate—a treaty which guaranteed the sovereignty of the reservation and the independence of the people—the dam was completed. It stands today as the product and symbol of how the non-Indian way of life was imposed upon the Flathead Reservation, and of how Indian people have both resisted and participated in the transformation of this once sacred place.

The disruptions of World War II ensured that in the following decades, the pace of cultural change would only increase. Former Salish-Pend d'Oreille Culture Committee staff member Germaine White (born 1951) spoke of this sense of dislocation during those years:

> Culture and tradition changed so fast. What happened when your entire life-way changes, when you're no longer a hunter, when you're no longer a fisherman, when you don't camp and move around and visit with your people, and rely on trade, and rely on your traditional lifestyle? What happens to you when you get lost that way? People I think got lost.

Yet it is also true that through all of this, the native people and the native ways of this region somehow survived. Salish-Pend d'Oreille Culture Committee Director Tony Incashola (born 1946) stated that "There's a whole generation, different generations of people, who in their own way had to fight, had to survive in order for me and the rest of the tribal people to be here." And former Kootenai Culture Committee staff member Francis Auld (born 1953) reminded us that "Them old people, they didn't give up. 'Cause if they would have gave up, we wouldn't be here."

In the 1980s, a new twist developed in the history of Kerr Dam and the Flathead Indian Reservation. After the license for the dam expired in 1980, the Confederated Salish and Kootenai Tribes challenged the Montana Power Company and won an agreement to take over Kerr Dam in the future. We will explore that issue in Part III, with the looming question: will Kerr Dam, under tribal control, bring empowerment or disaster to the Indian people and Indian cultures of the Flathead Reservation?

Part III: The Dam and the Future

In 1938, a massive dam was completed on the lower Flathead River, near the very center of the Flathead Indian Reservation.

It was built by the Montana Power Company with the encouragement and approval of the U.S. Bureau of Indian Affairs. Montana Power would control the dam and its enormous revenues for the next fifty years, and it was named for the company president, Frank M. Kerr.

At the site of the dam, the company installed bronze plaques proclaiming the dam as a monument to "friendly cooperation" between Indians and whites. But today, some members of the Confederated Salish and Kootenai Tribes have a different idea of what the dam has meant for the people. As former Salish Kootenai College instructor Ron Therriault (born 1931) put it, "the dam was a symbol...of the domination of tribal sovereignty."

And for some elders, the memory of how things were before the dam calls into question the supposed benefits of its construction. Salish-Colville-Spokane elder Joe Eneas (1896-1997) recalled how when he was a child, in the years before the reservation was opened to white settlement, he and his family would ride across the open, roadless, unfenced prairies of the Mission Valley to the falls of the Flathead River. They would stay there for a week or two, harvesting great numbers of bull trout during their spawning runs: "So the water used to go in a circle. [Gestures] There was kind of a hole there. That was a long time ago—that's where we used to go fishing. Yes, it was good." **

The construction of Kerr Dam put an end to all of that. And in a larger sense, the dam was part of a far larger and longer story: an eighty-year assault on the traditional cultures and political sovereignty of the Pend d'Oreille, Salish, and Kootenai people that began with the Treaty of Hellgate in 1855. Under the terms of the treaty, the tribes ceded the vast majority of their aboriginal territories, and reserved from cession a relatively small piece of land—the Flathead Reservation—for their "exclusive use and benefit." But in the decades to come, the treaty's promise of sovereignty was broken repeatedly by policies implemented by the Bureau of Indian Affairs and by laws passed by Congress, including the Flathead Allotment Act and the Flathead Irrigation Act. The building of the dam at a place of sacred meaning to tribal people was only the culmination of that series of events.

In the years after the dam's completion, the pace of change and cultural loss only quickened on the Flathead Reservation. World War II, in particular, deeply affected the already fragmented communities, as Pend d'Oreille elder Margaret Finley (1926-2005) said:

> Since the time I was small and to the time... when they really took change was when we got

in war with Japanese—Pearl Harbor. Right after that—everything changed very fast, very, very fast......We don't go up.....dig bitterroot, go up the mountains and pick huckleberries, go camping—those [things] were just gone.

And after the war, [we] tried to gathering again, you know, gather back together and start back where we left off before the war—how we do things together, happiness, all that. [But] it all changed....everything changed. Lot of it [was] gone. But it used to be so nice.

In the years after the building of Kerr Dam, nine more major dams would be built in the Flathead-Pend Oreille River system, and another nine major dams in the Columbia River downstream from the confluence with the Pend Oreille River. In the neighboring Snake River drainage system, sixteen major dams were erected after 1938. Many of these dams had devastating effects on tribes throughout the northwest, as ancient salmon runs, sacred places, village sites, and crucial habitat for plants and animals were obliterated. Among the most damaging was the Dalles Dam at Celilo Falls, completed in 1957, drowning one of the most important tribal fishing sites in the Northwest. A newsreel from that time showed a pre-dam image of tribal fishermen on traditional wooden platforms dissolving into a shot of the monumental cement form of the completed dam. The narrator gave bald expression to the ideology of the dam-builders: "'Net' proceeds become 'net' profits—as once again red man bows to white man's march of progress. A river is harnessed," intoned the narrator, "and the old order passeth."

For some elders, those dams destroyed something profound and important in the world, with serious consequences—not only in terms of the environment, but also in a spiritual sense. Not long before his passing, Kootenai elder Joe Antiste (1894-1989) forcefully expressed his sense of what had been damaged, and of the possible repercussions:

Now, that's why I was thinking. Pretty soon, we'll all be gone. White man, he didn't know what he's doing. Make dam—dams all over. You know what's going to happen to us? Just once, it busted all dam—that dam, water coming out. Water kill us. Lightning come up there, that water get burned. That's what [is] going to happen to us! That's what I'm always thinking to myself. Getting bad! White people just getting too far.

The construction of so many massive dams had indeed inflicted great harm to Indian cultures and to the plants and animals of the region. But in more recent decades, in what was a surprise to many non-Indians, many tribes began to pick themselves up and fight back, reasserting themselves as a presence in the political landscape. On the Flathead Reservation, the tribal government began to develop a more powerful sense of its sovereignty during the 1970s, as the powers restored by the Indian Reorganization Act of 1934 and subsequent laws began to be exercised more vigorously by tribal leaders. At the same time, many younger Indian people took a renewed interest in the traditional culture and way of life. By the time the license for Kerr Dam came up for renewal in 1980 before the Federal Energy Regulatory Commission (FERC), the governing council was ready to challenge the Montana Power Company for control of the dam-site.

In 1984, a young member of the Confederated Salish and Kootenai Tribes named Teresa Wall-McDonald (born 1954) was appointed to fill a vacancy on the tribal council, in part due to her experience researching the Kerr Dam issue for the tribal legal department. Ms. Wall-McDonald recalled her appointment:

When I think back to that time in my life when I was on the tribal council, and we were negotiating with the Montana Power Company for control of the dam, the issue was like an obsession with me. It consumed my life. It was so very important to me to get control of the license, if not in this licensing period, then sometime in the future.

At the same time, Ron Therriault was elected to the tribal council and then appointed tribal chairman. He described the reaction of many non-Indians — including many who had at times

Figure 2.15 Kerr Dam dedication. L to R: unknown, Michel, Čhšisu (Little Martin), Šnayaqn Quequesah, Qlawqn (Alec Beaverhead)

been allies of the tribes in the past—to the tribal bid to control the dam:

> We initially went for the license, and the response of the non-Indian was really unique. Because they had a fear. And the fear was that we would have the dam, the license, the money. And with the money comes that *power*. In the same way, that money....could at least lend to ending the dependency on the United States. And somehow that just brought fear into the non-Indian people around the reservation.

While the tribal council pursued legal and administrative strategies to gain control of the dam, tribal members and some non-Indian supporters organized protests and vigils to express support for the tribal effort. A large multi-day encampment was held at the damsite, and it was clear that the issue had struck a chord among the people. As Ms. Wall-McDonald recalled, "People were there guarding the site. It was a sign of unity for tribal members. It was an expression of intent of the tribes' desires to control the license and to keep Montana Power Company off of it." A delegation of people from one of the Kootenai bands in British Columbia traveled down to the Flathead Reservation to show their support for their American relations. "Today, you young people should be talking for your rights!" exhorted one of their elders. "Stood up and speak for your rights! Fight for your rights!"

The activists of 1984 were inspired, in part, by those tribal elders who still held vivid memories of the promises made by the power company in 1930—and then promptly broken. In surviving newsreels from 1930, the President of Montana Power Company, Frank M. Kerr (1869-1940), can be seen and heard presenting the project in grandiose terms, and offering the usual predictions of only beneficial consequences for Indian people:

> It has been decided that my people make this great development of your property, make use of this idle water for you, and all who may be able to use its power. If it shall fall upon me to carry on this work, I ask that you send your young men to help me, and that you come and set up your tipis, and visit us when you can.

The reality was not so felicitous. In 1930, with the Bureau of Indian Affairs giving nothing but encouragement and support to Montana Power, tribal people simply did not have the political muscle to stop the dam. But at a time of great economic need—and with the subsistence tribal economy having been largely dismantled over the previous century—many tribal people did appreciate the opportunity for good-paying jobs at the dam.

In addition to the opportunity to earn decent wages, as many elders recalled, there was also Montana Power's promise to provide tribal people with free electricity. "We were supposed to get our lights free that time, when we all signed up," said Salish-Kootenai elder Agnes Kenmille (born 1916). Salish elder Agnes Vanderburg (1901-1989) also remembered the power company's big promise: "They lied about that also. They said you would have electricity, and it wasn't so." ••

In the 1930 newsreel, one can see, in the chiefs' statements to Mr. Kerr, acknowledgement of the promise of free electricity. A translator for the Salish chief, Martin Charlot (1856-1941), thanked Kerr for having "broughten light to us for posterity, for the future to come." And the Kootenai chief, Koostahtah (1891-1942), publicly adopted Mr. Kerr into the Kootenai tribe—and bestowed upon him a Kootenai name, giving him a tanned hide with the name painted upon it. The newsreel recorded Chief Koostahtah's words in his language: "I'm giving him a name. His name shall be 'Light.'" °

Such a public adoption, and the high honor of being given a tribal name, was also a way of reminding the Montana Power executive of his obligation to the tribes. But it was an obligation that Mr. Kerr and the power company nevertheless quickly forgot. As Kootenai elder Joe Phillips (1936-1997) angrily pointed out, "We don't even own the dam. We can't even get power from it. We have to buy it just like everybody else. That free power....that our elders talk about, what happened to it? Who got the free power?"

Figure 2.16. Kerr Dam dedication. Second from left, Chief Martin Charlo. Third from left, Chief Koostahtah.

Like many other tribal members, Mr. Phillips was also outraged by the Bureau of Indian Affairs' lack of help to the tribes in 1984 in trying to obtain the federal license to run the dam. "I always ask this question to myself, and I always say, where in the Sam Hill was the BIA? The BIA is a big joke as far as I'm concerned." As Teresa Wall-McDonald noted, "The Bureau of Indian Affairs did not provide any technical assistance or any sort of support for the tribes in pursuing the license. They didn't react fast enough. It was like they were ten years too slow in preparation for the issue."

The BIA's malign neglect ended up having an unanticipated effect within the tribal government. At first, there were divisions with the council over what strategy the tribes should pursue. Some thought the tribes should aim only for as much money as they could get. As tribal Executive Secretary Fred Houle (1928-2004) put it:

> ....a lot of the council felt that their obligation was to get the best deal for the tribes, the most monetary return for the tribes—whether it was through relicensing the dam to Montana Power or some other entity, or getting the license in their own name. The bottom line was, how much can we make off of it?

Others, however, believed that as a matter of tribal sovereignty it was also important to secure control of the dam. Ron Therriault was a leader of that faction:

> One of the things that came out of the negotiations with Montana Power Company is that we had an element of people that were very unhappy, because what they wanted was money—cash—right now. And to me this is an indication of the lack of tribalism. And maybe it's an indication of the success of the bureau, and of the government, to assimilate people. But the whole concept that, "There's the money. I want it right now. I don't care about the generations to come"—that is totally against tribalism. Because what you always do, as a leader especially, is consider what's not only good right now, but what would be good for the future, for the future generations.

With each act of abandonment and betrayal by the BIA, however, Mr. Therriault could see the tribal council becoming more resolved to pursue control of the dam, and to seize control of the issue:

> As the council becomes stronger, and as the people on the council become more capable, then what started to happen was that the BIA was told what they should do, rather than being asked what *we* should do. And that changed the whole relationship between this tribal government and the Bureau of Indian Affairs.

The tribes had to deal not only with a BIA that was utterly failing to protect their interests, but also with the Federal Energy Regulatory Commission (FERC), which had neither much knowledge nor much interest in the particulars of tribal history and culture. And FERC would be making the final ruling on the issue. As Fred Houle stated,

> It was the realities of the case where FERC didn't want to turn over to an Indian tribe a valuable resource such as Kerr Dam. And I don't believe they understood that fully—that it was tribal property to begin with. They took it as just another relicensing issue.

FERC processed the competing bids for the license through an administrative judge named Bruce Birchman. "I believe the judge knew we were in an extremely vulnerable position," said Teresa Wall-McDonald.

> He knew how weak our case was. We couldn't provide any evidence of being able to retail the power at that point in time. But I don't think that he understood the history, or how difficult it had been. Nor did he understand the bitterness [of] some of the tribal members.

In the end, the final settlement did not give the Confederated Salish and Kootenai Tribes what they wanted immediate control of the dam. But they did get a rental fee for the damsite of $9 million per year for thirty years, to be adjusted upward annually to account for inflation. And then, in the year 2015, the tribes would have the opportunity to take direct control of the dam itself.

About a decade after FERC's Kerr Dam decision, Republicans in the Montana Legislature passed a law, signed by Republican Governor Marc Racicot, that deregulated the energy industry in the state. The result was that Montana Power Company executives quickly liquidated the entire holdings of the company, leaving shareholders with worthless paper, and leaving most consumers with much higher electricity rates. Kerr Dam ended up being owned by Pennsylvania Power and Light. But PPL still must abide by the terms of the license, and the Confederated Salish and Kootenai Tribes will still have the opportunity to assume ownership of the dam in 2015.

Like many tribal members, Joe Phillips had a mixed assessment of the outcome, but an appreciation for the difficult position in which the tribal council was placed:

> We can't say really today, did we do enough? Did we do the right thing? Did the council do the right thing? I know they did one thing—they went and put their best foot forward. They tried to negotiate in the best of faith. Today, as I look back at it, they were trying to negotiate with a man with a stacked deck....

And Mr. Phillips was probably also not alone in expressing a burning commitment to ensuring

that the government and the energy companies abide by every aspect of the deal:

> We are going to have to make sure that they..... live up to their obligations. They never lived up to the first one.....and if that's what you're going to get, then do the things that we didn't do, which is to send that sucker down the God-dang river in little pieces.

Assuming the deal is kept this time, Kerr Dam will likely bring the Confederated Salish and Kootenai Tribes a level of income—and a kind of power to determine their own destiny—that they have not had since the time of the Hellgate Treaty. In 1990, economists estimated that Kerr Dam produced about 50 million dollars per year for the Montana Power Company. Surely that figure is significantly higher in 2007. And almost certainly it will be even higher in the year 2015.

For the tribes, the dam could provide the kind of funding that enables a free re-imagining of the tribal future. On one level, the income could provide more support for various tribal programs, or for per-capita payments, or for reacquisition of land within the Flathead Reservation. But the level of revenue that Kerr Dam is likely to bring the tribes may permit consideration of issues on a much deeper level and over a much longer time-frame. After a century of cultural loss, the tribes may in a real sense have a new kind of power to choose their own way of life. The dam could conceivably enable a kind of cultural self-determination. And so the looming reacquisition of Kerr Dam provides an opportunity for tribal members to have an open discussion of the future in the broadest terms.

But the very history that led to the construction of Kerr Dam also produced a number of cultural and ideological rifts among the tribal membership. It left divisions among the people over what their future direction should be. The question now looms as to whether tribalism – tribal culture in more than just a superficial sense—can or should be revitalized as the actual living way of life of the people.

Many of the elders interviewed for *The Place of the Falling Waters* expressed a profound hope that the tribes would use the money for the revitalization of the traditional ways. As Kootenai elder Alec Lefthand (1913-1996) said, "We're trying to encourage the young people to come back to the old Indian ways of living....And that's how we should keep using our Kerr Dam money—to be more in the Indian ways, to use it in the Indian ways."

A countervailing perspective was provided by Fred Houle:

> Well, that's pretty much socialistic, and I don't think that either one of the tribes would go along with it. I think....they [can] celebrate their traditional culture individually, which is fine. But I don't think you'll ever get them to the point where....everything will be share and share alike. They're too capitalistic to do that. A strict tribal community was very socialistic, and I don't think we're headed in that direction.

While Mr. Lefthand imagined many cultural purposes for which "our Kerr Dam money could be used," he worried that people with more power within the tribal government, like Mr. Houle, "don't look at it that way. They want to put their money in where they'll get their money back... to make money." Ron Therriault adamantly disagreed with Mr. Houle's sense that tribalism was a thing of the past: "...the concept of everybody together...[is] dead only in their minds. It's not dead in the minds of the youth."

A young tribal member in 1989, Vince Pablo (born 1970), seemed to validate Mr. Therriault's hope that older tribal values continued to guide the younger generations: "Myself, with the, with the sweats and the traditional doings that we have....it kept me in line....It kept me on a good road, where I'd learn and I respect what they do....with the sweathouse and with their creator."

Former Tribal Council Member Kevin Howlett (born 1951) questioned the degree to which the tribes had adopted the culture of the dominant society and hoped that a path could be found that would retain the tribes' cultural identity:

> How much should we develop? How much can the land stand? How much can the culture stand?....we've got to go the way of the Indian..... We've got to go the way that preserves the integrity of what we are. We're not brown-skinned people who happen to live along Highway 93. We are the Salish and Kootenai people.

Tony Incashola (born 1946), now Director of the Salish-Pend d'Oreille Culture Committee, expressed the concern of what would happen if the tribes do not take action on basic cultural issues: "If we ignore our culture, if we let other cultures dominate, then our culture will die. We'll fade away, and we will no longer be a people, an Indian people." And Francis Auld (born 1953), then with the Kootenai Culture Committee, echoed that concern:

> How many people thirty years old, Kootenai and Salish, can, can stand in a bunch together and converse in their language? How many Kootenai and Salish twenty-year-olds can stand together and say, "This is the the way my ancestors conduct a certain ceremony?" How many Salish and Kootenai kids can you take and give them a drum and tell them to sing? There's not too many, and not enough....We have to wake up! We have to wake up and....let it come to life again. Let it live again.

Tribal control of Kerr Dam may be both a power and a burden, but it has given both young

and old the chance to offer their dreams for the future. And many, as we saw above, hoped that the tribes would be bold enough to imagine and implement the restoration of tribal cultures. Salish elder Louise McDonald (1905-1994) was clear: "I'd like to see the old ways come back. Because nowadays it's going too far the other way....The old Indian ways [is] what we should do." She acknowledged, however, that it would be "pretty hard" to pull off. Francis Auld believed, however, that "We can do it. Language can be revived, culture can be practiced—not exactly the way it was done two, three hundred years ago, but I think it can be practiced, and it can be done so the heritage will continue."

And Agnes Vanderburg offered her vision and hope: "I strongly believe that this will happen, with my helping them. I think we will make it. I strongly believe this will be." ••

Whether for good or for bad, tribal control of Kerr Dam will bring great changes to the Flathead Reservation. Can the tribes use this resource in ways that will nurture the tribal cultures? Or will this money only lead the people to adopt more completely the values and way of life of the non-Indian society? Former Salish-Pend d'Oreille Culture Committee staff member Myrna Adams (born 1956) pointed out that the dam is a reality, and the question is not whether it will be used, but how: "There's nothing we can do—I think about taking away Kerr Dam or getting rid of it—[but] it's there, and it's going to be there a while. And we might as well make good use of it."

Francis Auld expressed confidence that it could be used to the benefit of the Kootenai, Pend d'Oreille, and Salish cultures: "It took money to destroy it, and it's probably going to take money to revive it again. And I think we're a smart enough tribe to do it—if we stay fair and just with the people."

Some people began envisioning specific uses for the income from the dam, and clearly many are already beginning to think in big terms, including Naida Lefthand (born 1947) of the Kootenai Culture Committee:

> ....mainly I'd like to see the tribes purchase as much of the land back, and gain control of it, and possibly go into aboriginal territory and start purchasing land....my dream is that someday, the Kootenais and the Flatheads will own all of western Montana.

Ron Therriault felt that

> one of the major uses for that money should be for education. We have to teach our children to live in two worlds. That's a fine balance—but they've got to know who they are, and where they came from. That's the security of the people. But they also have to know how to live in this new world, and use the technology of the new world. That money could be used there.

If the hopes of Ron Therriault and Naida Lefthand, of Tony Incashola and Francis Auld, of Agnes Vanderburg and Louise McDonald and Alec Lefthand and so many other elders—if those hopes can be realized, then ironically, a dam that helped destroy tribal culture may in time be used to restore it.

Today, the Indian people of the Flathead Reservation are dreaming their future. They are dreaming a future they now have the power to create—*if* Kerr Dam can be used in this way. Until now, the dam has been a part of the loss of tribal sovereignty and culture. But depending on how it is used, it may now become a tool of regeneration and hope.

Ron Therriault expressed his dream that

> a hundred years from now, I'd like this reservation to look like it did a hundred years ago. I'd like it to be one place in this world that's still as pristine as possible. And altogether, it's the people and the state of mind of the people that we have to preserve. We have to preserve our natural existence.

And Agnes Vanderburg told us her vision of the future: "I think that it will be good....I'm glad there are a lot of children...learning the Indian way....I think many of them will go that way." ••

And finally, Francis Auld expressed the hope that

> A hundred years from now...somebody can go up to one of my grandkids, and say, "*Who are you?*"
>
> And they can say, "*This is who I am, Kootenai.*"
>
> Or they can say, "*This is who I am, Flathead. I am an Indian, a human being.*"
>
> That's what I would like to see.
>
> I'd like to see them say, "*This is my land.*"
>
> ....And another hundred years from *there*, there'll still be a person to say, "*I am an Indian, a human being. This is my land, and these are my children.*" ○

The Place of the Falling Waters
A documentary film by Roy Bigcrane and Thompson Smith

In Memoriam: Joe Antiste (1894-1989) and Agnes Vanderburg (1901-1989).

Dedicated to the elders who have shown the way, and to those who are yet to come.

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Aerial cinematography by Rick Gerard.

Traditional music by Pistol Creek Drum and Chief Cliff Drum.

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You can order copies of *The Place of the Falling Waters* and the accompanying study guide by contacting the SKC Media Center by phone, fax, email, or snail-mail. Address: SKC Media Center, Salish Kootenai College, PO Box 70, 52000 Highway 93, Pablo, MT 59855. Phone: 406-275-4878 or 275-4879. Fax: 406-275-4801. Email: frank_tyro@skc.edu or roy_bigcrane@skc.edu. Website: http://kskctv.ske.edu.

The Roundup of the Pablo-Allard Buffalo Herd

During the early part of the twentieth century the pending opening of the Flathead Indian Reservation to white homesteaders forced Michel Pablo to sell his herd of buffalo to the Canadian government. For thirty years the herd had survived and multiplied along the banks of the Lower Flathead River. Rounding up the buffalo and shipping them to Canada by railroad was a reservation spectacle for several years. These pictures of the roundup were published in Thomas W. Jones, *The Last of the Buffalo: Comprising a History of the Buffalo Herd of the Flathead Reservation and an Account of the Last Great Buffalo Roundup* (Cincinnati, Ohio: Tom Jones, Publisher Scenic Souvenirs, 1909).

A LONG DRINK AFTER A THIRTY MILE RUN.

A FAVORITE BUFFALO CROSSING ON THE PEND D'OREILLE.

MICHEL PABLO DIRECTING HIS COWBOYS TO POSITIONS TO SURROUND A HERD OF BUFFALO.

AN OLD TIMER COOLING OFF.

Buffalo and the Salish and Pend d'Oreille People

by the Salish-Pend d'Oreille Culture Committee

The relationship with the buffalo lay at the heart of the traditional way of life of the Salish and Pend d'Oreille people. The elders tell of the respect for the buffalo, and of how much the people relied upon them, both spiritually and materially. They tell how the buffalo was their most important source of meat, of how great a gift the Creator gave the people in providing the buffalo. There are many stories of how the people risked their lives every year in going to buffalo, where there was the danger of battle with enemy tribes—a hazard which increased greatly in the nineteenth century, first with the introduction of firearms, then with the reduction of the bison herds. For countless thousands of years before that time, the Salish and Pend d'Oreille people had lived in a sustainable relationship with the buffalo. When the first non-Indians arrived, they found a land covered with millions of bison—so many that they had difficulty believing that native people had lived here for so long.

"Going to buffalo" was part of the traditional cycle of life. The elders tell that when the wild roses bloomed in late spring or early summer, they knew that the buffalo calves were fat, and it was time to move east to hunt. The people would begin the journey as soon as they had dug their supply of camas.

After tribes throughout the region acquired the horse, the Salish and Pend d'Oreille would often be joined on their hunts by Spokanes and other tribes from the west. Before the horse, a number of Salish bands were based at places east of the mountains, such as Three Forks. Some Salish-speaking peoples closely allied with the Pend d'Oreille also lived east of the mountains, such as the now-vanished Tunaxn of the Sun River area.

The Salish and Pend d'Oreille developed a wide-ranging, complex trail system throughout their vast territories, and several routes connected the lands west of the mountains with the buffalo grounds to the east. Most often the people traveled up the Clark's Fork and Little Blackfoot Rivers to čmlše, the Helena area, and from there continued east to the Yellowstone and Musselshell country. Sometimes the Salish traveled east from the Hamilton area over the more rugged Skalkaho Pass. At other times, they went over through the Big Hole Valley. The Pend d'Oreille would usually travel by more northerly routes, the Blackfoot River or Marias Pass—moving to the clear plains near Great Falls and Shelby. At the Judith River treaty on October 1855, the Pend d'Oreille insisted on, and won, affirmation by the Piegans and others that they had always held aboriginal rights to hunt in the Sweetgrass Hills.

Until buffalo became scarcer, the people usually returned home during summer or early fall. In later times, some parties would stay through the winter on the plains. They relied on medicine men to help the people locate the increasingly scarce buffalo, and at times to break the bitter cold of plains winters when the very survival of the camp was threatened. Elders have told in detail of the many ways bison were hunted. In the time before horses, the people utilized their intimate knowledge of the buffalo and the land itself to herd them over cliffs, the "buffalo jumps" such as those near Bozeman and Great Falls. In later times, buffalo were hunted from horseback using highly efficient and effective weapons, including lances, bows and arrows, and then guns.

Uses of the Buffalo

The respect held for the buffalo was reflected in the way the people used all parts of the animal and wasted nothing. This was central to the sustainability of the relationship between the people and the buffalo. It is difficult to find an account of buffalo hunting and the use of the buffalo by the elders where the lack of waste is not discussed. There are names in the Salish language for all of the cuts of meat and for all of the inside parts. When the hunters went out, they would be followed by the best skinners in the tribe, and when the meat would be brought back to camp, the women would have the dry meat racks ready. They would work day and night for several days until all of the buffalo were taken care of. The meat would be dried, pounded, and then packed into parfleches, often mixed with mint leaves to deter bug infestations. Even the hooves were boiled for food. The people knew certain ways to prepare and bake the intestines and the organs. The brains would be prepared and stored, and could keep for as long as five years. The neck hide of the bulls would be formed over stumps and then used for buckets, or sometimes it would be made into strong ropes by cutting it into long strips and then pounding it with stone hammers. The hair of the bulls would be braided for horse halters or bridles. The bones would be chopped and pounded, and bone marrow would be extracted and stored in hollowed out elderberry branches, and later used for lubricating oil.

The horns would be used for drinking cups or, in later times, for storage of gun powder. The robes were carefully taken care of and highly prized for clothing and bedding. The scraped hides, after expert tanning, would be sewn together with great skill by women to make lodges or tipis, which were known for their ability to keep cool in the summer and retain warmth in the winter. The ribs of the buffalo made excellent hide scrapers, and the sinew was valued for its strength as thread. Of course, the dried buffalo chips – those over two years old – would be gathered by the children and used for making fire in the camps on the treeless prairies.

When the parfleches were full, the women would inform the chiefs that they should stop hunting to avoid wasting anything, and the chiefs would then announce that they would be moving back to the west the next day.

The Pend d'Oreille Save the Buffalo from Extinction

The elders say that in the second to last year of the traditional Pend d'Oreille buffalo hunts, the hunters were able to kill only 27 buffalo. The following year, they killed only seven. The buffalo that had once blanketed the plains, fed and clothed the people for thousands of years, were gone by the early 1880's.

Fortunately, however, the Pend d'Oreille had already saved the buffalo from total extinction. The elders have told how some years earlier, a man named Atatice², or Hawk Blanket, had proposed to the chiefs that the people herd some of the orphaned calves back west of the mountains to begin a herd on the Flathead Indian Reservation. The people could see that the numbers of the buffalo were already declining, and inter-tribal conflicts over the dwindling resource were intensifying. But Atatice² was suggesting a fundamental change in the traditional way of life. After three days of council, the leaders remained divided, so Atatice² withdrew his proposal. In the late 1870's however, the chiefs seeing that the non-Indian slaughter of the buffalo would not stop, allowed Atatice²'s son, Łatáti (Little Hawk Blanket), to carry out the idea. About six calves survived the journey west. Some years later, Łatáti's stepfather, Samwell, sold the herd to Michel Pablo and Charles Allard. Pablo and Allard ranged the buffalo in the grasslands along the Flathead River, where the herd quickly grew to hundreds of animals.

In 1896, Allard died, and in 1901 some of his portion of the herd was sold to the Conrad family of Kalispell. Other portions of the Allard herd were sold to Howard Eaton, a friend of Charles Russell. Eaton later sold his animals to Yellowstone Park. Thus the origin of the Yellowstone Park herd were in part the buffalo originally saved by Łatáti.

After 1896, most of the herd continued to roam on the collective lands along the Flathead River. But then, in 1904, Congress passed the Flathead Allotment Act, which would cut up the land into smaller parcels and eventually throw open the reservation to non-Indian homesteaders. Though bitterly opposed by tribal people, the act forced Michel Pablo to round up and sell his herd. Unable to find an American buyer, he sold his herd to the Canadian government, and by 1908 some 695 buffalo had been rounded up and shipped by special train cars to Alberta. Some were too wild for the cowboys to catch, and when white poachers began to shoot them, Pablo told tribal members to hunt them for food.

In 1905, some wealthy non-Indians formed the American Bison Society in New York. In 1909, they convinced Congress to seize over 16,000 acres of the Flathead Indian Reservation in order to form a National Bison Range. A price for the land was dictated to the tribes, who were given no power over the matter. Pend d'Oreille oral historian Blind Mose Chouteh told of the meeting that was held in St. Ignatius, where tribal leaders told the U.S. Indian agent they did not want to give up the land, because it was some of their good hunting grounds. But the agent told them they had no choice in the matter. At considerable expense, the government then brought portions of the Pablo-Allard herd back from Canada.

In the 1980's, the Confederated and Salish Kootenai Tribes, who maintain one of the most sophisticated and capable Natural Resource Departments of any local government in the United States, put forward a modest proposal to assume management of the National Bison Range. No visitors would be kept out. Even most of the existing staff of the Bison Range, almost all of whom were non-Indian, would be retained. Yet due to extreme reactions by the general public and even by public officials, the idea was tabled. Some 20 years later this tribal proposal came to fruition. In 2004, an agreement was reached between the federal government and the Confederated Salish and Kootenai Tribes for tribal management of the Bison Range.

Big Medicine

In May 1933, a buffalo cow at the Bison Range—in all likelihood a descendant of the buffaloes that Latati had rescued some sixty years before—gave birth to a white buffalo calf. The calf was named "Big Medicine" in recognition of his sacred significance.

Other Photos of Q̓ʷiyq̓ʷáy by the River

Figure 2.22. Buffalo roundup near the river.

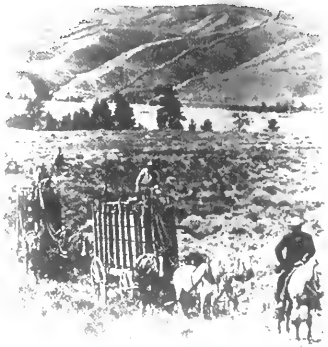


Figure 2.23. Transporting buffalo in custom-built wagons.

Figure 2.24. Sketch by Charlie Russell in a letter to Phillip Goodwin of the "Great Buffalo Round-up" on the Lower Flathead River, January 1909.

Big Boats and Ferries of the Lower Flathead

Figure 2.25. The paddle boat "The City of Dixon," on perhaps its only excursion on the waters of the Lower Flathead. The big boat burned on one of its first outings.

Figure 2.26. View of Sloan's Ferry near the site of the present day Sloans Bridge. Photo from Mission Valley News, *February 7, 1979, page 14.*

To Dam or Not to Dam: Corps of Engineers Studies Additional Dams in the 1970s

In 1976 the U.S. Army Corps of Engineers identified five dam sites on the Lower Flathead River below Kerr Dam. Four of these were proposed for hydroelectric energy production and a fifth for reregulation purposes. The largest hydropower site, called Knowles, was located at river mile 2.5 and if constructed, would have inundated the entire length of the Lower Flathead River and significant portions of major tributaries. The reservoir would have covered a total of 51,500 acres. The average annual energy production would have been about 181 megawatts without reregulation and 171 megawatts with reregulation.

The second site, called Moiese, was located at river mile 30. Its purpose would have been for the reregulation of upstream impoundments. A dam here would have impound water for about 6.5 miles of the river and inundated 2,700 acres.

The Buffalo Rapids Number 4 site was at river mile 36.5. Two alternatives were proposed for this site. The first, a low, run-of-the-river dam would have created a 3,370 acre reservoir and impounded 25 miles of river. This facility would have generated 70 MW without reregulation and 83 with reregulation. The high dam would have created a 16,500 acre reservoir that would have reached Kerr Dam. It would have generated 122 MW with and 133 MW without reregulation.

High and low dams were also proposed for the Sloan site at river mile 45. Here the high dam would have inundated about 12,500 acres and produced 126 MW with and 99 MW without reregulation. A low run-of-the-river dam at this site would have produced 67 MW.

The Buffalo Rapids Number 2 site was located at river mile 61 where a run-of-the-river dam would have inundated 11 miles of river creating a reservoir of 3,350 acres and producing 90 MW with and 62 MW without reregulation.

In 1979 congressional funding for hydropower studies on the Lower Flathead River was terminated before the studies were completed, however, the interim report stated that all of the sites were, at best, marginal. In the mid-1980s a private group proposed to reinitiate studies of several of these sites. This effort failed, however, due to tribal council and public opposition to the proposal. Since then no new proposals have been developed.

Research on specific dam proposals indicated the projects would have had substantial negative impacts on fish, wildlife, and recreation resources. The most significant wildlife impact would have been the loss of habitat and species diversity. Resident deer, for example, would have lost important island and bottomland habitat. The same would have been true for upland game species that frequent river riparian areas. Backwater and slough habitat critical to furbearers and a variety of bird species would have been lost. Waterfowl production would have declined significantly because of the loss of island nest sites and brood habitat. Tree perches and nests for raptors such as bald eagles and osprey would have been inundated, as would have cliffs important to cliff- and bank-nesting species such as prairie and peregrine falcons, cliff swallows, and kingfishers. Trout and northern pike populations would have also been impacted since upstream migration would have been blocked. In addition, fluctuating water levels would have caused substantial bank sloughing that would have created high levels of turbidity in reservoir waters.

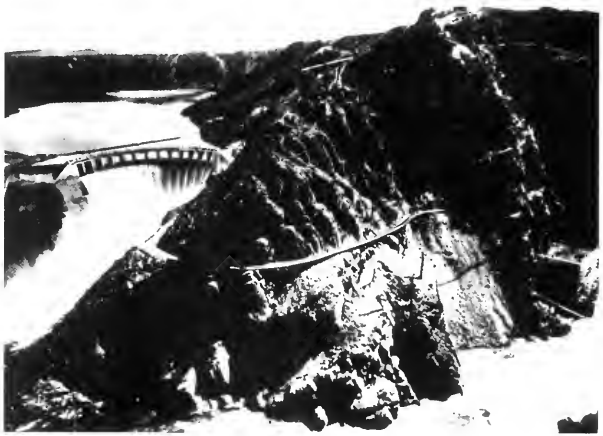


Figure 2.31. Kerr dam in its early days.

Public Testimony Opposes Lower Flathead River Dams

Many Confederated Salish and Kootenai Tribes members voiced strong opposition to the Army Corps of Engineers' proposals to build additional dams on the Lower Flathead River. Testimony was given at public meetings hosted by the corps in 1978. Portions of these public meetings were included in the film *The Army Corps of Engineers Takes It In The Ear*, produced by the late Billy Soul's Soul Video. The following narratives were transcribed from the film.

Testimony by Thomas "Bearhead" Swaney, Confederated Salish and Kootenai Tribal Council Representative:

"To those of you who are for the dam, ask yourselves what it will do for you. Are you going to derive the benefits from the power? Is your power bill going to go down? Is tax dollars going to pay for it? Once again the dams that are built, they'll be put on tribal land. And we won't be paying taxes to the county, and once again we'll be making a division in the community—a division that none of us really need. And we will be blamed, and the corps and Bonneville Power, whoever it is, will go on its way. They will be in another community doing the same thing. I don't know what the outcome of this will be. I do know that I feel that I am taking part in an exercise in futility. That our mind has already been made up for us. That whatever you say tonight will have no bearing, because we are the small people, and we will have to bend to the larger group in the Pacific Northwest. I do not envision the United States acting fair with us and when I say us, I say that collectively. That we are being asked to be a power pool for the Pacific Northwest, without urging other people to conserve power. Without urging the aluminum industry in particular to conserve power.

"I only know that the commitment that has to be made by the people has to be a total commitment to stop this project or these projects. We're being sold a bill of goods. We are being asked to sacrifice our community for the greater good of the greater number in the Pacific Northwest. If I'm not mistaken, that was an old Jeremy Bentham theory, and when he coined it was wrong even then. Because as individuals you have the right to say yes or no and those of us that are in power must listen to your right of expression. That river to me is not just a river. It's this community. And if this community allows that river to be dammed up, we will dam ourselves up and we will be the same way as that river."

Testimony by Joseph McDonald, Confederated Salish and Kootenai Tribal Council Representative:

"I'm a member of the tribal council as you introduced here. I've been a resident of the reservation for most of my life. I've spent about 15 years away from here and at that time realized you know, what a wonderful place we have to live and I'm very interested in preserving it and keeping it that way. My position is opposed to any dam construction as Louie [Adams] and Lawrence [Kenmille] and Bearhead have said. I'm also opposed to any further studies that the corps might do. I'm opposed to the dams for the following reasons:

"I think that the area of the river that you showed on the diagrams, Buffalo Rapids 2, 4, and Sloan's high, is going to cover, flood an area that is a great recreation area for a lot of people, both Indian and white. The area from Kerr, you people that haven't seen it, to Buffalo Rapids is an excellent area for white water float trips and is very scenic to look at. If you get up on those high bluffs and look down at it from the west side it's a beauty that I think is unparalleled by any place in the United States. You've got that beautiful gorge, the water, those black rocks, the rapids, the mountains up in the back and it's just something that we don't want to lose."

Testimony by Thurman Trosper, member of the Confederated Salish and Kootenai Tribes:

"....We get down to hydro-energy, we've developed most of our hydro-energy in this country and most of it is in the Pacific Northwest and what little, what else we have is down in the Tennessee Valley Authority.

The point I want to leave with the Army Corps of Engineers is they ought to back off and take a hard look at the conservation of energy. Now other countries like Sweden, have a higher standard of living than we do, they use less energy than we do. They don't have a standard of early obsolescence: use it, throw it away. They have policies of making things to last, and.... This is the kind of thing that we've have to start looking at in this country because there is no way that we can ever meet the energy demands. You just have to accept that. There is no way that you can do it.

"Now what I hear going on here tonight just leaves me aghast. We're locked in the short run game with the Corps of Engineers. This isn't the solution to the energy problem, building these dams, destroying a pristine river. And there's no way you can mitigate the loss of that river. You've lost a precious crown jewel. You've just lost it and it's gone forever. There is just no way you can mitigate that. I hear the corps up here telling me we're going to mitigate this and mitigate that. There's no way you can mitigate it. It's a one-of-a-kind resource, and when you give it up it's gone, it's gone from this valley and from the Unites States and it's gone forever.

"And for what? For cheap beer cans. Most of our electricity in the northwest goes for making aluminum. Maybe we can do without it. You ever think of that?"

Along with tribal members, many non-Indians shared the sentiment to protect and preserve the river in its current state.

Testimony by Sherry McDonald:

"My name is Sherry McDonald and I would like to talk to you as a teacher. I haven't heard from that section yet, so I thought I'll take my turn. It sounds like you fellows up here, the Corps of Engineers, have decided to build the dams no matter what the people want to do. You are not studying the history of the region in depth as you are the economic value or the power value of the region. Will the government never learn? We have sun and wind in great abundance and yet I haven't heard anything from the corps except that it is not feasible at this time, or we're going to study it twenty years from now. There is no reason why it can't be studied right now in the same depth as you are studying the dams. Not twenty-two years from now.

"We live in an area that is full of white and Indian history. Early encampments of Indian tribes and white pioneer settlers along the riverbanks are some of the historical events that will be lost under tons of water. Now through all of the studies that I've heard, I haven't heard any of this. I don't know if you fellows have looked into the history books. They're hard to find and you really have to search for them. Now we can drive or walk or float to these areas and see these historical spots. As a teacher of school children, I strongly protest the government taking these drastic steps in demolishing a beautiful river for the sale of power. We have to put some priorities first. Our past, rich with history should be preserved for our children and our children's children."

Testimony by Douglas Baty:

"I'm Douglas Baty from Dixon and I've been concerned about the study as it's progressed and I've done my best to follow it and gone to all the public meetings. Tonight the corps has come again and it's a repeat of the ones I've seen before. At each of the public meetings they've been greeted with protest and they've responded with assurances that they are listening. But after each hearing their study rolls on unaffect-

ed. It seems to me they're wearing two different hats, which is why so many of us conclude, are forced to conclude, that their statements are not to be trusted. On the one side they contend that they are a neutral agency fulfilling the public will. But on the other hand, they reveal themselves as an advocacy agency, committed to the dam construction regardless of opposition or cost. I won't forget the time as a meeting we held in Polson a year and a half ago, when it was asked by someone in the audience for those who were in favor of the study to stand and be counted and for those who were opposed to the study to stand and be counted. As I counted them, the numbers were 80 to 20, opposed to even the study going on, and the Colonel's conclusion was it looks to him about half and half. And I have the feeling tonight, we speak from our hearts and no matter what we say, it's like the computer says 'Thank You,' and no matter what we say it's put here in a special bracket to be ignored, and I'm very frustrated.

"I would like to find a way that we can express our opinion and have it not be ignored. I'd like to ask them tonight for an analysis of the responses they've received and how many of those responses have been in favor of the construction. Each of the papers have had strong editorials opposing them, including the *Missoulian*. When I've asked them this before, they responded by saying they are also supposed to represent the views of those people who haven't expressed their views, and this seems to be a mockery of representative government..."

Thomas "Bearhead" Swaney

Thomas "Bearhead" Swaney was one of the most vocal tribal member opponents of the proposed dams. He was the subject of numerous interviews on the topic and some of his personal responses were included in yet another film titled *The River is Wider Than It Seems*. Bearhead's statements against damming the Lower Flathead River will appropriately conclude this section:

"Montana Power looked at it and they're really not that interested, and the corps with their mentality will dam up a garden hose if they have the chance.

"I think that there are those on the tribal council who think there's going to be some money in it. And, uh, there are people among the tribe who feel there's going to be money in it. That's, you know we have to try to understand something about a reservation. And that thing about a reservation is that we can't take everything from it. You know somewhere along the line you've got to give something back to a reservation. You've got to leave a river, you know, left alone. You've got to leave a stream alone, you've got to leave a deer, you've got to leave an elk. You can't take everything off of it. It's a finite place. You know this is all we've got. We're not going to get any more. You know they don't build any more land.

"I don't feel that my tribe has to sacrifice a river for the northwest.

"That river, at all costs, has to be saved. People have to understand that the river is alive and it has a soul and a heart just like you and like me... Once you destroy a river, that river is destroyed forever.

"It's a place where a lot of people should sit down on its banks and dream their dreams and sing their songs."

CHAPTER 3

A NATURAL HISTORY OF THE RIVER FROM THE PLACE OF FALLING WATERS TO PARADISE

The Lower Flathead River is a good place to [illegible] *young pike minnow and cutthroat and rainbow* [illegible] *American dipper* [illegible] *waters in search of aquatic insects. Spotted sandpiper* [illegible] *killdeer search* [illegible] *cobble* [illegible] *Sparrows flit about in search of seeds and berries among the juniper, dogwood, wild rose* [illegible]

Dippers seem to be among the most enthusiastic of these birds, always bouncing or fl[illegible] *ing headlong into a current. Slate gray and small — about the size of a blackbird — dippers* [illegible] *their living by plunging into rushing waters, where, fully submerged, they walk the bottom* [illegible] *crustaceans, flatworms, and, occasionally, fingerling fish. They do the same in winter, some*[illegible] *are unusually strong. But their feet are unwebbed, so they use their wings to propel themselves where* [illegible] *fly underwater and can forage easily in currents too swift and deep for people to stand in. They have been known to* [illegible] *30* [illegible] *fat stonefly. Their song, in contrast to their bzeeeet alarm call, is as unforgettably clear and bright as the streams the*[illegible] *Lower Flathead, you are most likely to see dippers in the canyon below Kerr Dam.*

Geology

The geologic cross-section at right (figure 3.1) is for the area just south of where Mission Creek enters the Lower Flathead River. In a general sense, the geology it shows is similar to that of much of the river: valley-fill deposits from the last ice age rest atop one-billion-year-old bedrock.

The unconsolidated valley-fill deposits represent a complicated history of several glacial advances followed by flooding of the area by Glacial Lake Missoula. W. C. Alden, a geologist who worked here in the 1940s and 50s, believed that at one stage, the glacier extended as far south as Dixon and the hills south of St. Ignatius.

Prominent features resulting from the glaciation include the Mission and Polson Moraines; the river cuts through both of these features (figure 3.2). The surface of the Mission Moraine is characterized by a swell-and-swale topography. Examination of well logs indicates that wells drilled into the Mission Moraine typically penetrate a sequence of clays containing gravel, cobbles, and boulders (glacial till) and commonly terminate in gravel or sand and gravel. In places, the moraine is covered by remanats of silt deposits that accumulated in the bottom of Glacial Lake Missoula. These silt deposits are called lacustrine because of their lake origins.

The Polson Moraine, located at the southern end of Flathead Lake is fairly smooth on the surface. Alden thought that it may have developed below the surface of Glacial Lake Missoula based on the character of the surface, the presence of lake shorelines on the south slope of the moraine, and the relative altitudes of shorelines on surrounding hills. (Glacial Lake Missoula pooled behind an ice dam on the Clark Fork River in northern Idaho. The lake occupied about 1,000 square miles of western Montana. Thick deposits of silt and clay settled at the lake's bottom.)

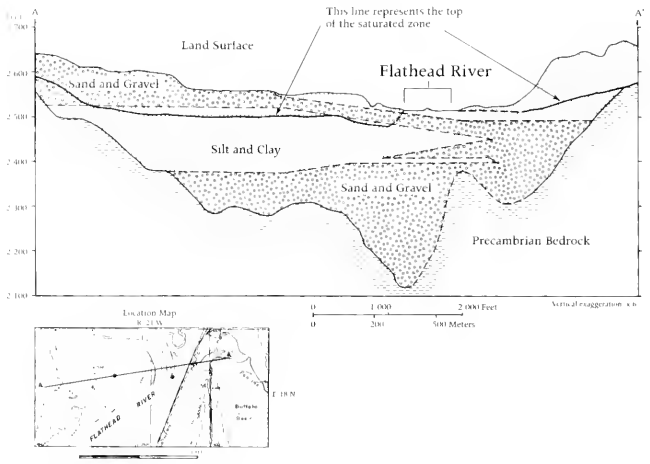
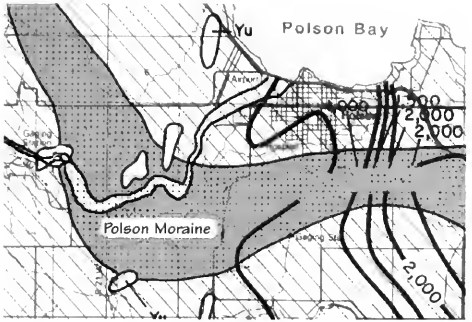
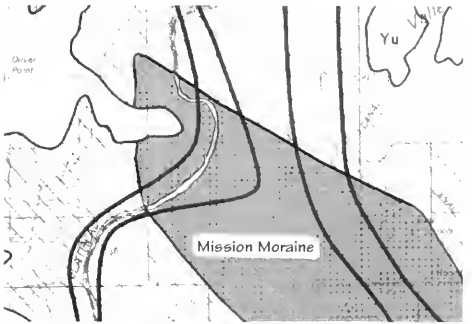


Figure 3.1 A geologic cross-section of the Lower Flathead River just north of Dixon.

Types of Moraines

An end moraine that forms at the farthest point of a glacier's advance is called a terminal moraine. A terminal moraine that forms as a glacier recedes is called a recessional moraine. The Mission Moraine is considered a series of imperfectly developed recessional moraines. When glacial till is not dumped into a pile but instead is spread evenly over a valley floor like pickle relish over bread, it is called a ground moraine. Ground moraines form when a glacier retreats without pausing and therefore puts down its load in a continuous, hummocky sheet. When the Flathead Glacier melted back in the Mission Valley, it left such a moraine sitting atop the ancient bedrock: a rolling blanket of rubble, a chaos of boulders, cobble, and gravel in a thin soup of sand, silt, and clay.





Figures 3.2.a and b. The river cut through two large moraines, the Polson Moraine (left) and the Mission Moraine (right) as it travels through the Mission Valley.

The rest of the river's course is mantled by ground moraines deposited by various advances of the Flathead Lobe of the Cordilleran Ice Sheet. Most of the wells drilled into these deposits penetrate tan, brown, or gray clay containing imbedded gravel and cobbles. (This ground moraine also underlies the Polson and Mission Moraines.)

Along most of the river, all this glacial till is overlain by silt and clay deposited by Glacial Lake Missoula. These Lake Missoula silts and clays form the big kahki-colored cliffs one sees along the river between Buffalo Bridge and Dixon.

The floodplains of creeks that flow into the river are underlain by stream-deposited sand, gravel, silt, and clay. Stream deposits are called alluvium, and these are composed of sorted silt, sand, and gravel derived from Belt rocks and reworked glacial deposits. (Belt rocks are talked about in the next section.) Because it is stream deposited, this material typically consists of interlayered lenses of silt, sand, and gravel resulting from the migration of the stream channel.

At the base of these valley-fill sediments is bedrock—a foundation of rocks known collectively as the Belt Supergroup. Along most of the river, Belt rocks lie buried beneath as much as 3,500 feet of valley-fill deposits. However, they do appear at the surface in places, such as in the canyon below Kerr Dam and along the south side of the river between Dixon and Perma. Belt rocks can also be seen in the mountains and hills bordering the river—in the Salish Mountains, Ferry Basin Area, and Moiese Hills, for example. The story of how the Belt rocks came to underly the river is one that has captured geologists' interest for over a century, for Belt rocks are some of the oldest Precambrian sedimentary rocks in the world and contain some of the earliest multicellular plant fossils found anywhere.

The Story of the Belt Rocks, the Rocks that Underlie the Entire Reservation

Next time you are out on the river, stop beneath one of the rock outcrops and pick up a piece of the rock that has broken free. Chances are, the piece you are holding will be dark to medium gray, fine-grained argillite about 1.3 billion years old. The story of this modest piece of rock is, at least in a general sense, the story of most of the bedrock that underlies the river. That story, in its broadest outlines, is as follows:

Just under 1.5 billion years ago, the rock was sediment, a mix of clay, silt, and sand eroded off some barren landscape (a landscape absent of plants because there were no land plants at the time) and transported by a river to an enormous shallow body of water something like the Caspian Sea. When the sediment finally settled, it rested on top of 10,000 feet of similarly deposited sediments, at a spot some 50 miles west of what is now the Flathead Indian Reservation. There, at the bottom of this immense sea, it formed a mud rich in calcium carbonate and quartz. Water levels rose and fell. The mud beneath shallow water rippled under the action of waves. Some was exposed to the air and dried and cracked. Soon more sediment rode in and covered what was there. Deposition continued for hundreds of millions of years, and the few ounces of

sediment composing that rock you are holding became buried beneath thousands more feet of sediment. All the while, gravity bore down on the mass, and the entire basin slowly sank deeper into the earth's mantle. Pressure transformed mud into rock argillite, quartzite, limestone, and dolomite—most of it preserving the marks of waves, desiccation, and rain.

Gradually, the basin filled until finally, the deposition stopped. The sea dried, and the millions of layers of compressed sediment sat undisturbed for a billion years. But those sediments were part of a continental plate that was slowly drifting west across the Pacific Ocean, an ocean that, at the time, was crowded with island arcs and small continents. Collisions, dozens of them, were inevitable. Islands the size of New Zealand and Japan smashed into North America one after another. Even though the collisions took place in slow motion, the forces were gargantuan, and they shoved, crumpled, and heaved the crust of the continent into long, corrugated chains of mountains. Rocks folded and faulted and rode over each other. The compression fractured portions of the basin's rocks and thrust a slab 300 miles long and 20,000 feet thick 50 miles across northwestern Montana. That prodigious chunk would become a good part of western Montana, and the little chunk of rock you hold sat somewhere in its middle.

This great thrust happened from 60 million to 70 million years ago. Since then, erosion has been at work. Most occurred during the Pleistocene, when glaciers sculpted the surrounding mountains into what they are today and left behind enormous moraines in the valley bottom. (They include the Flathead ground moraine, and Mission and Polson terminal morianes.) About that time, ice dams periodically backed up the Clark Fork River, each time creating a new Glacial Lake Missoula. Whenever the lake was full, tons of silt and clay sediments rolled into it and settled on the bottom and covered the moraines. After the dam broke the final time, the sediments were exposed. The Lower Flathead River, following pretty much the same course it does today, cut through those sediments, in places exposing the bedrock. Once exposed, rain and frost and gravity took over. For the first time in its billion-plus-year history, sections of the belt rock cracked and crumbled. Pieces of it fell away almost daily, until finally, the one you picked up dropped along the side of the river.

Looking Back a Billion Years or So

The rock is known to geologists as Belt rock because the first place it was described was east of here, near Montana's Belt Mountains. Belt rocks are well known among geologists because the Belt Supergroup contains some of the oldest well-preserved sedimentary rocks in the world. They preserve in their layers, better than any other rock in North America, a record of the Middle Proterozoic, the geologic eon in which they formed. Consequently geologists rely on them to develop hypotheses about everything from paleogeography (how the continents were arranged during the Middle Proterozoic) to the history of the western half of North America.

The most senior of the Belt rocks formed about 1.4 billion years ago, when the earth was around 3 billion years old. For perspective, the earliest fossils of land plants appear in rocks that are about 450 million years old. They are a billion years younger than the Belt rocks. Dinosaurs show up in the fossil record 200 million years after land plants first appear, and humans come on the scene some 240 million years after that.

Because we tend to think in terms of a few generations, geologic time frames are difficult to comprehend. To help your students grasp such enormous spans, ask them to imagine that the punctuation mark at the end of a sentence in their textbook represents one year. One and a half billion of those periods lined up side by side would reach all the way across Montana and halfway into North Dakota, a distance of 750 miles. Stand on the first of those periods, the one touching the Idaho border, and look down that line of dots toward Bismarck. That is roughly the vantage we have when we try to consider events that happened so long ago.

Walk that line, and each step takes you back roughly 650 years. Forty steps and you are 25,000 years before the present, roughly the time, according to most archaeologists, when humans arrived in North America. Walk another mile or so and you are near the beginning of the Pleistocene, the glacial epoch or Ice Age, when the Mission peaks were sculpted. You would have to walk 27 miles to be present during the time when the Belt rocks were being thrust into their present position. If you start out at the Montana-Idaho border, those 27 miles would put you just east of Libby. If you wanted to travel all the way back to the time when the Belt rocks formed, you might want to take a bus.

The earth plods. It requires millions, even tens of millions of years to make mountains and just as long to take them apart. Thrusting a four-mile-thick slab of Belt rock 50 miles probably took 5 to 10 million years. Since then those rocks have eroded less than an inch a century. Rock is resolute, but with enough time, even the continents move.

Imagining the Belt Basin

It might be interesting for your students to learn something about the origin of the Belt rocks since in addition to underlying the river, they make up virtually all of the mountains on the reservation.

Although there have been half a dozen explanations for the origins of the Belt sediments, two prevail. The first has the sediments accumulating in a marine environment—over tidal flats, in deltas, and in the open ocean. According to this theory, the basin was part of a continental shelf that extended into a proto-Pacific Ocean. In the second explanation, the basin is an inland sea, a giant lake that lay within the North American continent at a time when it was joined to another landmass. This sea, sometimes fresh, sometimes salty, may have been open to the ocean, but only during the earliest part of its history. Today's Caspian Sea or Black Sea, are roughly analogous, except that during the Middle Proterozoic, land plants had not yet evolved so there was nothing to slow erosion. When it rained, the water gushed across the land in gigantic sheets, carrying huge quantities of mud and sand with it. Over the eons, the sediments built up enormous fans or aprons thousands of feet thick. Eventually, they filled the basin.

At the foundation of the second interpretation is the theory of plate tectonics, which says that North America and other continents sit on plates that slowly glide across the earth's mantle. The plates are pushed by convection currents circulating in the mantle, much the way dumplings are pushed around by boiling soup. Plate movement is slow—an inch or so a year (about the same speed that your fingernails grow)—but it is ceaseless and, given geologic time spans, enough to ensure momentous change in the geography of the planet.

The movement of plates periodically brings continents together, and the resulting collisions are violent. Continental crust crumples, and mountain chains are born. The Appalachians, the Alps, the Himalayas are examples. Plate movement also pulls continents apart, most often along the relatively weak welds where two plates had previously joined. That side of the process is called continental rifting, and it is occurring right now in Africa's Great Rift Valley. If rifting continues there, East Africa will eventually separate from the rest of the continent and become a continent unto itself.

According to the second interpretation, the Belt Basin was a rift, a place where the continent had stretched and broke and subsided and would ultimately tear apart. Geologic features suggest the western margin of North America has been married at least once to another continent. And there is good geologic evidence for a cataclysmic separation occurring about 700 million years ago. The inland sea interpretation is also supported by research that shows the Belt sediments generally become finer as you move east across the group, a trend that implies the muds washed in from the west side of the basin (because coarser, heavier materials settle first). Had they been accumulating on a continental shelf, that would have been impossible; there would have been nothing but ocean to the west.

So what was the land mass to the west from which all those sediments eroded? Researchers using radioactive isotopes to date sand grains imbedded in the Belt rocks have found they originated in granite that cooled between 1.64 and 1.86 billion years ago. No granite in North America is of that age. Closely examining the underlying rock of Siberia, Antarctica, and Australia—continents that paleogeographers have said may have been connected to North America during the Middle Proterozoic—researchers have found granite of identical age in Siberia. To say that the mountains of western Montana might be made of ground-up Siberia speaks volumes about how utterly impermanent is the geography of this planet. This may be a fun idea for your students to contemplate.

Shoving the Belt Rock Into Place

The laying down of that great assemblage of Belt rock constitutes the first and biggest chapter of the reservation's geologic history. It ended without major geologic incident, about 1.2 billion years ago. For the next 700 million years not much seems to have happened to the Belt rocks in the area. To the west, however, in eastern Washington, rifting continued and the continent that had been stuck to North America (the source of all the Belt sediments) drifted away. Then, about 500 million years ago, during the Cambrian period, sea level rose and large portions of Montana were flooded by ocean waters replete with early marine animals—trilobites, brachiopods, sponges, primitive mollusks, worms, and crustaceans. The Devonian and Mississippian periods followed and left behind more deposits—mostly dolomite and limestone. But throughout those hundreds of millions of years the Belt rocks of the area suffered little deformation. They show no signs of torture, record no great episodes of tectonic disturbance—no severe crumpling, no intense folding or faulting, no episodes of mountain building—only some gentle tilting and warping. Of course, erosion worked the rock, washed away entire formations, but only the top ones. Other than that, the Belt rocks rested comfortably.

Until 60 million to 70 million years ago. It is almost as if the rocks had been procrastinating, preparing for the five- to ten-million-year event that would transplant a large chunk of them 50 miles to the east, up and out of the Belt Basin. The chunk to be relocated was titanic—a slab 300 miles long, in excess of 50 miles wide and up to 4 miles thick. It didn't slip on its own, wasn't pulled by gravity; it was shoved. In the hundred million years preceding the chunk's displacement, North America was crashing into islands the size of Japan. The collisions battered and compressed

its crust, lifted mountains, and sent the future foundation of the reservation sailing, albeit slowly, across northwestern Montana.

Lifting the Rockies

One hundred and eighty million years ago, at the latitude of the Flathead Reservation, the west coast of America lay somewhere near the Idaho-Washington border. If it had existed then, Sandpoint, Idaho, would have been a Pacific seaport. At that time (the middle of the Jurassic) the west coast of North America ran from the border between the Yukon and the Northwest Territories south, through the middle of British Columbia, Idaho, and Nevada into the Gulf of California. Modern Alaska, the Yukon, much of British Columbia, and all of Washington, Oregon, western Idaho, and western California were absent — yet to be added. Those pieces sat as islands and microcontinents in the Pacific as Indonesia and the Philippines sit in the South China Sea. At the time, the North American Continental plate was drifting west. The Pacific plates were sliding under it and being pulled into the mantle. The island arcs, too light to be pulled into the mantle, gathered, one at a time over the course of 100 million years, onto the western edge of North America, fattening it into its present shape. (It might make a fun project for your students to draw the continent as it appeared during this time.)

The sum total of all those islands crashing into the west coast had the same effect as a continent-to-continent collision. It produced forces that raised and rippled North America from Alaska to Mexico. The early Rockies rose up. Even after the islands had stopped colliding (about 80 million years ago) the compression continued. The Rockies kept building for another 35 million years. This later, post-collision phase of mountain building, of folding and faulting, of thrusting and mashing, is called the Laramide Orogeny. It was during the Laramide that the Belt rocks moved to their present location.

The Great Thrust

The violence began when the compressive strain became so great that the Belt rocks broke, cracked along a nearly horizontal plane, and began to move eastward. In this, a thrust fault, a fracture forms nearly parallel to the surface of the earth. The rock on one side then begins to ride up and over the rock on the other side. The Lewis Thrust Fault, as this one is called, sliced slightly diagonally through the Belt Basin. Everything above that fault line moved, pushed along by the same compressive forces that caused the fracture.

The movement was spasmodic; the full displacement of the reservation's Belt rocks took millions of years. Lying still for centuries, they would lurch forward 10 or more feet in an instant. In such a moment the entire slab or major portions of it would leap forward and rattle the earth for hundreds of miles around. If you average these explosive bursts over millions of years, the slab sped along at probably less than half an inch a year. Striations on rocks show the direction of the advance was northeast. When the slab finally parked, it sat on top of rock 1,300 million years younger, violating the natural law that says rock gets older as you move down through the earth's strata.

Viewed from above, the Lewis Thrust Fault surfaces along a line that runs from Mount Kidd, British Columbia in the north, to Steamboat Mountain in west-central Montana in the south. In Montana, that line runs just inside Glacier Park's eastern boundary south along the Rocky Mountain Front. West of it are Belt rocks and the start of the Rocky Mountains. East of it are the beginnings of the Great Plains. The mountains that spring up there, just west of the line, that stand like a parapet against eastern Montana, are rootless in the sense that they are not anchored, not sunk into the earth like most mountains. Rather they perch on top of it, unconnected except by juxtaposition to the rock beneath.

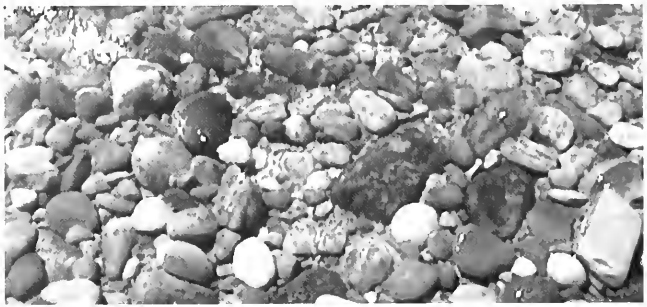


Figure 3.3 River cobbles and pebbles are Belt rocks, approximately one billion years old. Julie Cajune photo.

Geology Field Trips Along the Lower Flathead River

This section describes four short geology field trips. The first is from "Quaternary Geology of the Mission Valley Montana: Friends of the Pleistocene 1993 Rocky Mountain Field Trip," USDI, Bureau of Reclamation, Seismotectonics and Geophysics Section, Denver, CO. The other three were recommended by Seth Makepeace, CSKT Tribal hydrologist

Trip One: Glacial Lake Missoula and giant gravel bars.

0.0 miles. Start Road Log.

West end of the Polson Bridge. The narrow arm of Flathead Lake spanned by the bridge is the former course of the Flathead River (prior to the construction of Kerr Dam). At low water, the coarse, bouldery bed of the former channel is exposed. Kerr Dam is located about 3 miles southwest. The dam was completed in 1938 and raised the level of Flathead Lake 10 to 13 feet, but it stores 1.2 million acre-feet of water. The maximum elevation of the lake is about 2,892 feet. The highway ahead crosses a surface underlain by laminated lake sediment.

Questions for your students: Why was Kerr Dam built? Do we benefit from the dam today? How? Have there been any negative consequences associated with the dam's construction?

0.7 miles. Turn left on Irvine Flats Road. The turn is just past milepost 62 and a big sign for KOA. Stop just after turn. During the late Pleistocene, this site would have been under 1,200 feet of icy water (when Glacial Lake Missoula was at its fullest point) and under 600 feet of ice during the advance of the Flathead Lobe of the Cordilleran Ice Sheet—called the Flathead Glacier in some texts (figures 3.4a and 3.4b). The Polson

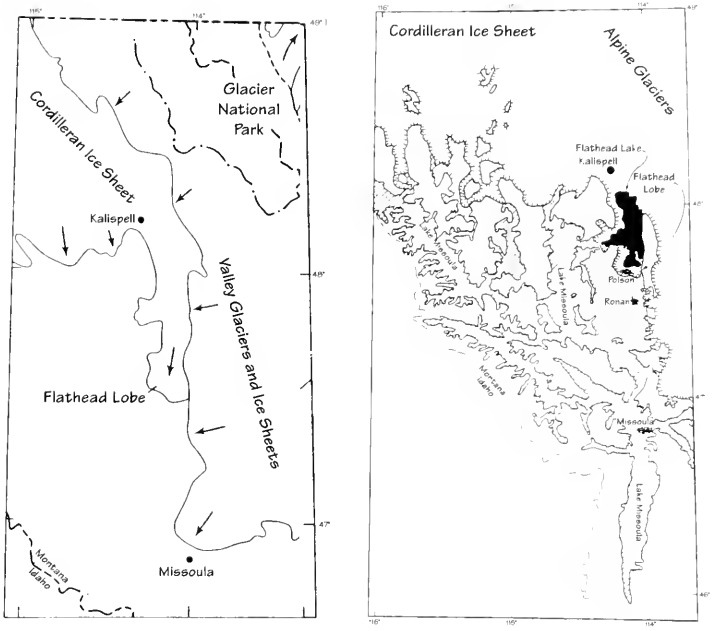


Figure 3.4 The map on the left shows the extent of ice in the northwest Montana region about 20,000 years ago. The arrows indicate ice flow directions. The map on the right shows roughly the same area with Glacial Lake Missoula added. Flathead Lake is shown for reference.

Moraine is to the southeast and south. Continue from here to the Buffalo Rapids Overlook.

Questions for your students: How do geologists know how deep Glacial Lake Missoula was? What is a moraine and how are they created? Do moraines have any importance to us today? The Polson Moraine formed under Glacial Lake Missoula. How is it different from a moraine that forms above water?

At mile 1.2 start of gravel road.

At mile 1.3 bedrock outcrops can be seen on the right behind farm buildings.

At mile 3.8 there is a gravel pit on the left.

At mile 5.2 numerous prominent shorelines developed on bedrock hills can be seen at 12:00 (straight ahead).

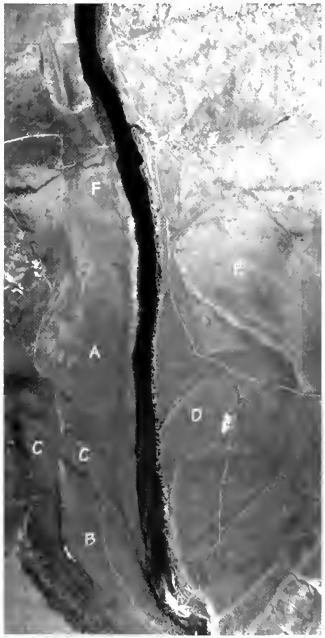
At mile 5.6 there is a T-junction, continue straight.

At mile 6.4 there is a sharp curve 90° to the left.

7.8 miles. Intersection with Irvine Flats Road and access road to Buffalo Rapids overlook; continue downhill on Irvine Flats Road past large dropstone on right. (A dropstone is a rock that was locked in an iceberg floating on Lake Missoula. When the ice melted, the rock dropped to the bottom of the lake.) As you drive downhill, there is an excellent view of the Flathead River and terraces below Buffalo Rapid. On the south side of the river, the surface on top of the lake beds (the former floor of Lake Missoula) slopes to the west. There are many well developed shorelines on bedrock hills to the right and in the distance. In some areas above the road there are large dropstones on bedrock.

The terraces on this part of the river are actually enormous gravel bars, each upwards of a mile long, created when Glacial Lake Missoula drained (figure 3.5). The magnitude of the flood was so large that many of the features it created only become really apparent from the air.

Questions for your students: Show the students the illustrations in figure 3.5, and ask them to identify each type of gravel bar at the Buffalo terraces.



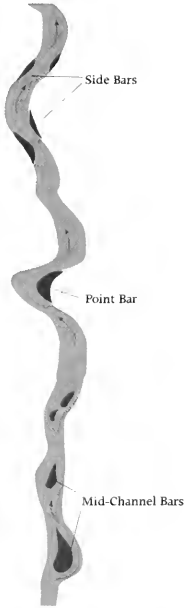


Figure 3.5. This air photo shows the terraces (A – F) below Buffalo Bridge. These are giant gravel bars created during the flood that occurred when Glacial Lake Missoula drained. You can see a gravel pit that has been dug into one of the terraces just to the right of the letter D. The drawing at right shows the different kind of gravel bars that form in rivers. Can your students identify the kinds of bars found below Buffalo Rapids?

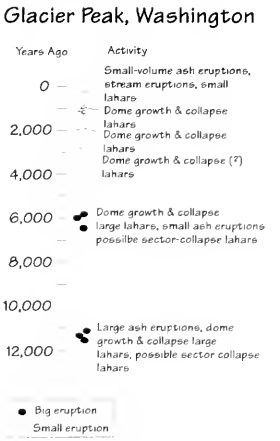
Trip Two: Volcanic Ash Layer from Glacier Peak. **Start at Sloans Bridge.** If you walk upstream along the north side of the river for about 300 yards and then drop down to the river, you will find a bleached-white layer on a terrace cut slope approximately 5 meters above the water surface. The ash is several centimeters thick and has a distinctive chalky or powdery texture. This very white layer is the Glacier Peak tephra. Glacier Peak is in the Cascades in Washington State. The tephra can be dated by geologists and is estimated to be 11,200 radiocarbon-years old. There are several ash layers on the reservation but it is rare to find a dateable ash layer. (There are three well preserved late Pleistocene ash layers in northwestern Montana: (1) Mt. Mazama ash—6845 years before present—deposited when Mt. Mazama erupted forming Crater Lake; (2) Glacier Peak G layer—11200 ybp; (3) Mt. St. Helens Jy—11400 ybp. All of these layers are chronologically exposed in lake cores, for example in Glacier Park.)

At this site, the tephra, a general term for all pyroclastic material released by a volcano, is deposited onto a river-worked terrace surface. The sequence of geologic events would have been as follows: (1) Glacial Lake Missoula fills, and sediments collect on the lake floor; (2) the lake drains; (3) the ancestral Flathead River cuts a channel through the terrace surface; (4) Glacier Peak erupts, and the ash drifts in and settles atop the terrace; and (5) the present-day river cuts its channel.

For geologists, the ash reveals that the present-day river is just a few meters below the terrace cut by the ancestral river. That means that over the last 13,000 years, the river has moved very little. The conclusion is that the Lower Flathead River is an extremely stable system. The sidebar at right gives some facts on Glacier Peak.

Some Facts on Glacier Peak

Glacier Peak, geographically the most remote of the Cascade volcanoes, is a Pleistocene and Holocene composite volcano composed chiefly of dacite, with a minor amount of basalt erupted from satellitic vents. Large explosive eruptions about—11,000-12,000 years ago produced: (1) two tephra-fall deposits of large volume, which are widely distributed east of the volcano, (2) seven tephra falls of small volume, and (3) many pyroclastic-flow deposits and lahars that form thick fills in the valleys that head on the volcano. The two large tephra eruptions were separated in time by probably no more than a few centuries. Tephra of each eruption is about 1 meter thick at a distance of 50 kilometers downwind from the volcano, and about 0.5 meter thick at a distance of 70 kilometers. These deposits represent two of the largest Cascade tephra eruptions of postglacial time.



Questions for students: Geologists say that tephra of each eruption is about 1 meter thick at a distance of 50 kilometers downwind from the volcano, and about 0.5 meter thick at a distance of 70 kilometers. How does this compare with the Mount St. Helens ash fall? Do you think someday geologists will use ash from Mount St. Helens to date our civilization?

Trip Three: Paleo-soil horizon and flood deposits. Dixon and the River Downstream from Dixon. **Start at Dixon.** Across the river from Hoskin's Landing in Dixon is a buried soil horizon that you can see from the Dixon side of the river. Sandwiched between two layers of river gravel is an organic soil horizon, which is thought to be quite old, probably at least several thousand years (figure 3.6). It is unusual to find a paleo-soil horizon like this. It takes a couple thousand years to develop such a well-developed organic soil profile.

As you travel downstream from Dixon and look to the north, you see V-shaped valleys up high with deposits "stuffed" up into them. Those are the old levees where material was side-cast off as Glacial Lake Missoula drained. These flood deposits record the elevation of the flood waters during the draining of Glacial Lake Missoula.

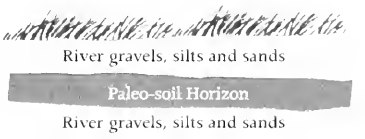


Figure 3.6. Cross section of the paleo-soil horizon in the park across the river from Dixon.

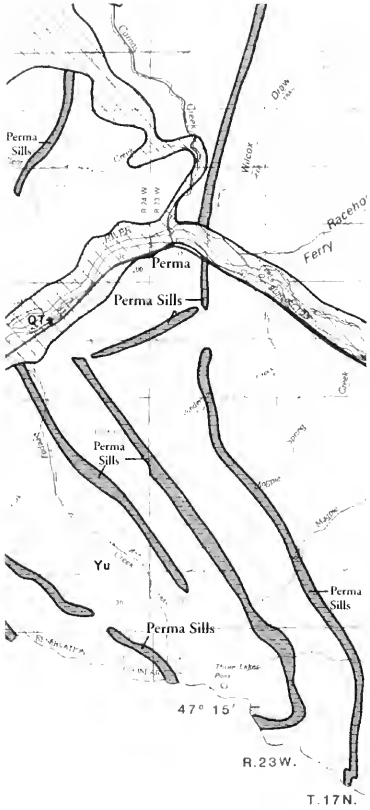


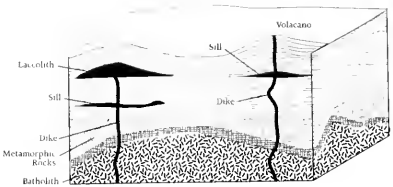
Figure 3.7 Location of the Perma Sills.

Trip Four: Igneous rock intrusions.

Perma Area.

Belt rocks, the rocks that underly almost all of the reservation, are sedimentary rocks that have been subjected to low-grade, regional metamorphism. Igneous rocks occur at the surface in only two areas on the reservation. One of these areas is near Perma (figure 3.7 and 3.8). There, a set of igneous rocks is intruded into the Belt formation. Called the Perma Sills, they are dark, fine-to-medium-grained dikes and sills. (A dike is a tabular intrusive rock that forms when magma squeezes into vertical or near-vertical fractures; a sill is a similar to a dike except that the magma has been injected into weak, easily penetrated, stratified rock.) The Perma Sills have what's called a laccolith form. A laccolith is a mushroom-shaped body of rock that forms when thick or viscous magma feeds from below and forces itself between rock layers, doming up the overlying strata. Typically, they have an arched top and a flat base. It is thought that the magma intruded when it was partly wet because there are "interfingering contacts."

The Perma sills are a mafic rock, meaning they are high in iron and magnesium. When the rock is exposed, the iron oxidizes and gives the rock its reddish color. Along the highway, the rock cooled in the form of six-sided columns called collinades. Collectively the rock is described as having a columnar structure. Columnar structure results from a system of shrinkage cracks or joints that form as magma loses heat. If the magma is homogeneous and cools slowly and regularly, centers of shrinkage are equally spaced. Tension occurs between the centers, and cracks form at right angles to the direction of the tension. In the ideal case (which this is) double cracking across three main tensional axes produces hexagons that form columns as the cracks penetrate downward.



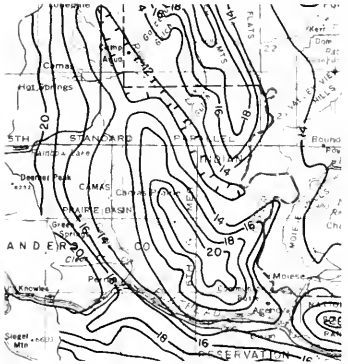
Figures 3.8 This diagram shows schematically what sills, dikes, and laccoliths are. The Perma sills include all three structures.

Climate

Mean annual precipitation at the river averages about 14 inches. Hills adjacent to the river are not quite as dry; those within a mile receive up to 20 inches of precipitation a year. The lower reach of the river, too, receives more moisture than the upper part; west of Perma just under 20 inches of precipitation falls in an average year (figure 3.9).

About half of that moisture comes in the form of rain. Precipitation is distributed fairly evenly throughout the year except for May and June, which receive about twice the precipitation of other months.

The mean annual temperature along the river is about 45° F. Mean monthly temperature ranges from the mid-20s in January to the high 60s in July and August. The difference between daily maximum and minimum temperature ranges from about 12° to 16° F in December and January to about 31° to 35° F in July and August.

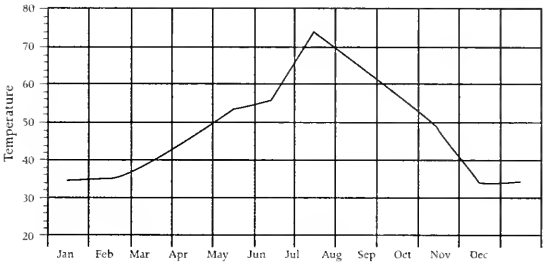


Figures 3.9. Mean annual precipitation for the river and adjacent lands.

River Water Temperatures Reflect Air Temperatures

River water temperatures reflect changes in air temperature, as the graph below shows. It gives mean monthly water temperatures in °F for the Lower Flathead River at Perma. The data is from 1985. During the summers, water temperatures in the Lower Flathead River are as much as 5° to 7° F higher than those recorded in the Flathead River above Flathead Lake. This is because of the natural warming of the lake waters that occurs in the South Bay.

The higher temperatures caused by the shallow South Bay, the large bay near the outlet of the lake, results in decreased habitat quality for native salmonids in the Lower Flathead River, at least seasonally. Summer water temperatures in the main river are near 68° F, as much as 18°F warmer than any lower river tributary inflow. Winter temperatures reach 32° F. The average annual water temperature is 48.2°F.



Hydrogeology

The Lower Flathead River (defined as the Flathead River below Kerr Dam) is the fourth largest river in Montana and has an average flow rate of twelve thousand cubic feet per second. Its headwaters originate in Canada, Glacier Park, and the Bob Marshall Wilderness. The three main tributaries, the North, Middle, and South Forks, join near Columbia Falls to form the Upper Flathead River. From there the river flows south into the north end of Flathead Lake. At the lake, the system is joined by another major tributary, the Swan River. The Lower Flathead River begins at the south end of the lake. It is regulated by Kerr Dam, located at river mile 72, just 3.5 miles downstream from the lake outlet. Kerr Dam includes a 200-foot-high, 381-foot-long dam; three penstocks; and a powerhouse containing three generating units, each rated at 60 megawatts. Below Kerr, the river flows south for 47 miles through relatively undeveloped range and cropland. At Dixon, it turns west and flows another 25 miles to its confluence with the Clark Fork. Annual operations of the Kerr Project affect the entire length of the river.

This report divides the river into four segments based upon its natural characteristics (figure 3.11). Segment One: the first four miles of the river below Kerr Dam cut through bedrock forma-

Segment	Description
Segment One	Kerr Dam to Buffalo Bridge *River miles 72 to 65*
Segment Two	Buffalo Bridge to Sloan Bridge *River miles 65 to 44.5*
Segment Three	Sloan Bridge to Foust Slough *River miles 44.5 to 31*
Segment Four	Foust Slough to Revervation Boundary *River miles 31 to 4.3*

tions to form a steep canyon. The river bottom through the canyon is composed of large boulders and bedrock. The remaining three miles of Segment One cut through Lake Missoula lake-bed deposits of whitish-tan silts and clays with lenses of sand and gravel. The stream bottom is a veneer of cobbles and gravel over clay. Segment One, when taken as a whole, has a gradient of 7.92 feet per mile and an average width of 374 feet. The upper four miles contain the only whitewater found on the river as well as the deepest pools.

Like the lower three miles of Segment One, Segment Two flows through silts and clays. These sediments, laid down by Glacial Lake Missoula, are usually varved (stratified in layers of annual deposition) and contain scattered, small pockets of stream-deposited sands and pebble-sized gravel. There are also occasional cobbles and boulders that were dropped by melting icebergs that floated on Glacial Lake Missoula. A 2.5 mile section of the river cuts through the western most extension of the Mission Moraine. The moraine, which is in places overlain by silts, is composed of an unsorted mixture of clays, sands, gravels, and boulders.

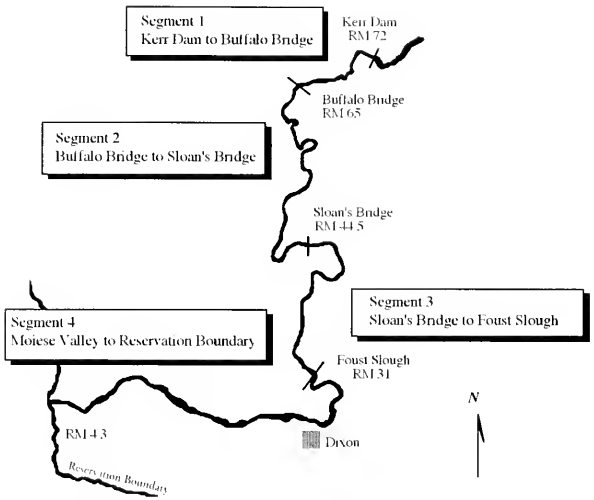


Figure 3.11. Major river segments described in the text. RM stands for river mile, which begin at 0 at the confluence with the Clark Fork River at Paradise.

With the exception of the moraine, the geology of Segment Three is similar to that of Segment Two. The river continues to wind through Glacial-Lake-Missoula-deposited silts and clays. Both Segments Two and Three are often bordered by steep, unvegetated bluffs and breaklands.

Soils along the river are extremely variable. They range from varved clays and silty clays to wind-deposited sandy loams. Susceptibility to wind and water erosion can be high as evidenced by the fact that gullying is common along this stretch of the river. In several places massive slope failures have occurred. Although the cause of these failures is not known, soils scientists suspect subterranean irrigation return flows and the summer fallowing of croplands may play a role.

The river in Segments Two and Three is characterized by a single channel (there are only a few small islands) that makes several large bends. Flow is generally tranquil (intermediate between riffle and pool) although there are areas of riffles. From river mile 64 to river mile 31 the river has an average width of 419 feet and a gradient of 2.6 feet per mile. The channel bottom ranges

from bedrock to cobble-rubble to large areas of silt deposits.

Only small remnants of Lake Missoula silt deposits remain in the valley downstream from Dixon, most of these washed out over the course of the many drainings of Glacial Lake Missoula. Hence from Dixon to the reservation boundary the river flows principally through alluvium (stream deposits), which is composed of moderately sorted to well sorted silt, sand, and gravel. There are also many areas of exposed bedrock. The channel is braided (about a third of Segment Four contains islands) and has numerous backwaters and sloughs. The channel width from Foust Slough to the reservation boundary averages about 650 feet with a gradient of about 1.58 feet per mile. The bottom has extensive areas of silt deposition interspersed with gravel and limited areas of larger rock material.

Plants

Vegetative communities within the corridor fall within three major categories: aquatic, riparian, and upland. Aquatic communities include plant species growing submerged in or emergent from water. Riparian areas are defined as the green zone that falls between aquatic and upland areas. Riparian communities are characterized by distinctive plant species that require or tolerate free or unbound water. Upland communities occur on sites that are not considered riparian or aquatic because the hydrologic regime is not wet enough to bring about the development of vegetation and soils characteristic of riparian or aquatic zones.

Aquatic communities are especially prevalent in the backwaters and sloughs of the lower half of the river (Segment Four). Submerged aquatics that dominate these often heavily vegetated areas include Canadian waterweed, water crowfoot, curled pondweed, slender leaved pondweed, and chara.

The dominant emergent aquatic species include common cattail, hardstem bullrush, horsetail, and reed canarygrass. These plants border sloughs and backwaters primarily on the lower segment of the river. Water star grass (*Heteranthera dubia*) is an aquatic species found at the sinkhole just downstream from Dixon (river mile 21.5) and has been found in just one other location in Montana. Another, flatsedge (*Cyperus acuminatus*), also has a extremely limited distribution in the state. Both species are classified as sensitive in Montana.

At least three emergent aquatic species are considered problem weeds. These are purple loosestrife, yellow iris, and reed canarygrass. Each has the potential of invading and dominating river backwaters and sloughs. Reed canarygrass is by far the most common of these three species and is one of the dominant aquatic plants found on the river. Canarygrass has been planted throughout the United States for forage and erosion control and is often not considered a problem. On the Lower Flathead River stands of the plant provide important nesting cover for geese. However, reed canarygrass forms dense, productive monocultures that spread rapidly. Because of its tenacity, rapid growth, and tendency to eliminate most other emergent vascular plants, it is now considered a major threat to many wetland ecosystems. Research shows drastic declines of wetland species after several years of reed canarygrass growth.

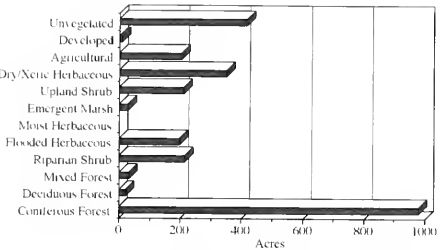
Natural aquatic communities are vital to the health of the river ecosystem. In addition to providing habitat for a large variety of insects, fish, shorebirds, waterfowl, and water-dependent mammals, submerged and emergent aquatic vegetation is especially important to northern pike as spawning habitat. Submerged vegetation also provides protective cover and feeding areas for adult pike and nurseries for young pike. The quality of these areas as fish and wildlife habitat has been negatively affected by the operations of Kerr Dam. In addition, Kerr has eliminated infrequent flood events and thus halted the creation of mid-channel bars and avulsion, processes which create new oxbows and side channel habitats. A management plan, called the *Fish and Wildlife Implementation Strategy*, which includes restoration and mitigation measures for fish and wildlife impacts, has been prepared by the tribes.

Riparian communities are the single most productive type of wildlife habitat found within the corridor, and they are vital for maintaining water quality, water quantity, bank stability, and fish habitat. They are also important for various human uses. They are utilized extensively for cattle grazing and many types of recreation. They also shelter many cultural and spiritual sites along the river.

Figure 3.12. Sehc Ssayuk (*wild onion*), *a common plant on river bars. Richard Ochoa photo.*

Note on Salish and Kootenai Names

Where two Indians names of a plant or animal appear separated by a /, the first name is Salish and the second is Kootenai. When only one name is given, the language is indicated in brackets following the name.



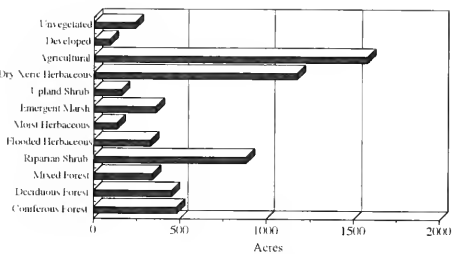


Figure 3.13a. Major riparian cover types for river Segments One, Two, and Three. Figure 3.13b, the same as shown for Segment Four in the chart to the right.

The riparian zone of the upper or north half of the river corridor (Segments One, Two, and Three) is quite narrow and species composition is characteristic of the later stages of floodplain succession. The principal species found along this part of the river are ponderosa pine, Rocky Mountain juniper, woods rose, red-osier dogwood, and black hawthorne. Figure 3.13a shows the abundance of each of the major riparian cover types (including emergent marsh) found on Segments One, Two, and Three in the late 1980s.

When compared with the upper river, the riparian zone of the lower or south half of the corridor (Segment Four) is wetter, more extensive (covering approximately four times the acreage of the upper half), more diverse, and more representative of the earlier and intermediate stages of floodplain succession. Dominant riparian species in this segment are black cottonwood, ponderosa pine, Rocky Mountain juniper, quaking aspen, sandbar willow, red-osier dogwood, and woods rose. Other common species are common chokecherry, western serviceberry, currents and gooseberrys, and western snowberry. Figure 3.13b shows the area for each of the major riparian cover types (including emergent marsh) for Segment Four in the late 1980s.

Significant portions of the riparian zone have been converted to crop and pasture land. Since the construction of Kerr Dam, riparian ecosystems along the lower twenty-five miles of the river have been converted to cropland and pasture uses at a rate of approximately seventeen acres per year, and this rate is expected to increase in coming years.

Some areas within the corridor have been logged in the past. Sinkhole Slough (river mile 22) may have been used as a holding and loading site for some of these logs.

The operations of Kerr Dam have changed the riparian vegetation of the Lower Flathead River in three major ways: first, the riparian zone has undergone a continual and substantial reduction in size due to a dewatering of the floodplain (the total loss has been estimated to be as high as 6,731 acres); second, riparian communities have undergone a decline in diversity as they have shifted from cottonwood and willow riparian dominance types (the pioneering species) to communities dominated by ponderosa pine and Rocky Mountain juniper (later successional stages); and finally, substantial riparian acreage has been converted to agricultural land. In 1997, dam operations changed from load following (peaking) to base-load, but the changes are not expected to provide much benefit to the riparian zone because the dam will still prevent large periodic floods, and flows will remain higher than natural flows during late summer, fall, and winter.

Overgrazing, too, has impacted the riparian zone by converting wetter shrub types to herbaceous vegetation, by promoting noxious weed infestations, by reducing or eliminating vegetative cover, and by promoting streambank destabilization. Cattle readily graze young cottonwoods, and this has contributed to the significant general decline in cottonwood regeneration throughout the corridor.

In recent years, leafy spurge has become established on the banks of some islands of Segment Four. Leafy spurge is extremely difficult to control and is rapidly spreading throughout the lower riparian areas. Other noxious weeds within the riparian areas include spotted knapweed, sulfur cinquefoil, and thistles.

The upland vegetation along the river is characterized by widely scattered stands of ponderosa pine and Rocky Mountain juniper; shrub communities which include big sagebrush, rubber rabbitbrush, antelope bitterbrush; sub-shrubs and forb species such as fringed

Indian-lit Fires Shaped Upland Plant and Animal Communities

Here in the Northern Rockies, fire, more than any other factor except climate, shaped the structure of vegetation above floodplains and riparian zones. It determined the kinds and ages of trees, how close together they grew, and the number and types of openings that existed. These structural characteristics in turn, determined the kinds of shrubs and animals that lived here.

The fires were caused both by lightning and people. Prior to European contact, the tribes used fire to manage vegetation. From the stories of elders, the historical accounts of early Europeans, and the findings of modern scientific research, we know that Indians have been purposefully burning in this area for at least 7,000 years. Fire kept brush down in favorite campsites, opened travel routes, enhanced berry production, increased forage for big game and herds of horses, and forced wildlife to move. Research conducted by fire ecologists like Steve Barrett has shown that the Indian use of fire was so extensive in some areas that the Salish, Kootenai, and Pend d'Oreille actually doubled the number of fires that would have occurred from lightning alone.

Figure 3.14. A cross-section from a S?átq"tp/ Himu (ponderosa pine) stump (above) reveals old fire scars that show an average fire frequency of one fire every 8.5 years.

Indian-lit fires fit a different pattern than lightning fires. Tribal people started most of their fires in spring, early summer, and fall, when burning conditions were less hazardous. In addition most of their burning was done at lower-elevations like along the river. As a rule, Indian-lit fires were generally of a lower intensity than lightning fires, which burned at all elevations and generally got their start in middle to late summer—the hottest and driest time of the year.

The scattered stands of ponderosa pine on the uplands above the river seldom see fires anymore, whereas before Europeans arrived, fires swept through their understories every seven to fifteen years. The low intensity blazes cleaned out the brush and competing trees and created open, parklike stands of ancient ponderosa pine.

By using fire on a regular basis, the tribes exerted a tremendous influence over the character of vegetation. Not only did they shape the age, spacing, and species of trees, they also had a major influence over the mix of birds and animals that lived here. The plant and animal communities we inherited—the big game, furbearers, predators, birds, rodents, food and medicine plants—are in large part the legacy of thousands of years of regular and purposeful burning by Indian people and frequent, uncontrolled lightning-fires. Fire has played such a large role for such a long time that many of our plant and animal communities now depend on it.

sagewort, arrowleaf balsamroot, spotted knapweed, and flannel mullein; and dry herbaceous communities which include western wheatgrass, Idaho fescue, bluebunch wheatgrass, rough fescue, needle and thread, red threeawn, spotted knapweed, dalmation toadflax, sulfur cinquefoil, and sand dropseed. Upland areas also include barren ground and steep, mostly unvegetated bluffs composed of clay and silt lake sediments. One species, sandbur (*Cenchrus longispinus*), which has been found on an area of sandhills one mile southeast of Sloan Bridge is previously unrecorded for western Montana, and there are only two other known locations for the plant in the state. The upland communities have been substantially altered by grazing, noxious weed infestations, fire exclusion policies, and the operations of Kerr Dam. The widespread presence of fringed sagewort and various noxious weeds is indicative of overgrazing. Trends in the 1980s and 1990s at Soil Conservation Service (SCS) clipping sites located on tribal land within the corridor indicated rapidly deteriorating range conditions. The sites went from excellent or good condition to fair or poor in a decade.

There are thirteen tribal range units intersected by the river corridor. Several other privately-owned lands within the corridor are used for range or pasture-land purposes. Tribal range units are permitted primarily for cow/calf operations and are used for either spring and summer or fall grazing. Grazing seasons run 3 to 5 months in duration.

Fire suppression has also affected upland communities by favoring the establishment of pine and juniper and increasing sagebrush stands.

Past Studies

A considerable amount of data has been gathered about plants in the river corridor, particularly those in the riparian zone. The Bureau of Indian Affairs (BIA) carried out a reservation wide range inventory and status report in the mid-1970s. This "windshield inventory" included some work along the river. Then in 1979 and 1980 a consulting firm contracted by the BIA collected data over two field seasons on reservation grazing units. Their report included a narrative section discussing range conditions including information specific to grazing units bordering the river.

A survey of the river's aquatic communities and the wetter portions of the riparian zone was conducted by the Billings Area Ecological Services Office of the U.S. Fish and Wildlife Service in 1979. This survey was designed to aid in the evaluation of the impacts of proposed hydropower development. Wetlands were mapped from aerial photography (in scale 1:24,000 flown in 1976 and 1978) and field checked during low level aerial and ground wildlife surveys. The agency used two in-house wetland classification systems in its analysis (a system described in the 1956 FWS Circular No. 39 and a system described in the 1977

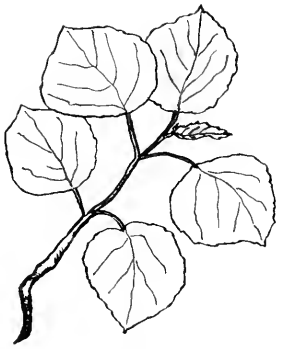
Mimłtè ·a-kł umak (aspen). The Tree with the Most Mosts

States and provinces throughout North America designate official trees and flowers—plants that represent that part of the world. If North Americans were to declare an official tree, they might choose quaking aspen (*Populus tremuloides*). It is the continent's most widely distributed tree and one of its most colorful. It is also the most genetically diverse plant ever studied, and it counts among its number not only the world's most massive individual organism, but also the oldest organism known. It can be found along the streams and springs feeding the river and growing near seeps in the uplands surrounding the river.

Ranging from central Mexico to northern Alaska and spanning the continent from west to east, aspen flourishes in a remarkable diversity of habitats; no other tree succeeds in as many distinct plant communities. Quaking aspen also crosses a surprising range of elevations, from sea level to treeline. Because temperature affects it less than moisture, aspen thrives where the thermometer dips to -70°F and grows where temperatures top 105°F. In experiments, the tree has survived temperatures as low as -314°F.

In this enormous range of growing conditions, aspen takes on a variety of growth forms. Under ideal conditions, an aspen tree might send its perfectly straight trunk 100 feet into the air. Seeds from that same tree planted at treeline in the Rocky Mountains might reach 2 or 3 feet in height, their trunks severely twisted. One can find countless variations in between.

The ability of aspen to reproduce asexually, through suckering, gives rise to two other extreme attributes: the tree's ability to reach enormous dimensions and its longevity. Root suckering is the process whereby an individual aspen stem sends out lateral roots that sprout new stems. Although the new stems grow to look like separate trees, they belong to a single genetic individual. Remove the soil from the roots of these clones, and one finds all the stems connected. They are like vertical branches. The largest single clone discovered takes in 106 acres in the Wasatch Mountains of south-central Utah. Comprising roughly 47,000 stems, it weighs an estimated 13.2 million pounds. The most massive living organism known, it is larger by far than the "humongous fungus" of Michigan or the largest of the giant sequoias in California. Named Pando (Latin for 'I Spread'), the clone is estimated to be 1 million years old. Age, in such a case, can only be guessed through indirect means; no one knows for sure how old it is. Many aspen clones are thought to be at least 10,000 years old. (These clonal ages refer to the age of the genome; actual physical tissue doesn't survive that long.) Other long-lived North American clonal species include bracken fern, red fescue, sheep fescue, and velvet grass. Their clones may be over 1,000 years old. Creosote bush and huckleberry may live in clones over 11,000 years old.



mimłtè/ ·a-kł umak
quaking aspen

DNA analysis reveals that aspen claims yet another "most." It is the most genetically variable plant yet studied. The average amount of protein variation in plants is about 50 percent. Aspen has a score in excess of 90 percent. Genetic variation increases with the amount of environmental variation experienced by the species, its population size, and the size of the geographic range. Aspen ranks high in all.

A few aspen facts follow:

- Quaking aspen is also called trembling aspen. Its generic name, Populus, derived either from the ancient Roman expression arbor populi, which translates as "the people's tree," or the Greek verb papaillo, which means to shake or tremble. The Irish called aspen "the shaking tree"; the Welsh, "the tree of the woman's tongue"; the Onondaga Indians, "noisy leaf."
- Individual clones of aspen are either male or female. Male clones dominate in dry climates, female clones in wet ones. In some places, the trees at lower elevations are mostly female, while those higher up are almost entirely male.
- An old female stem may produce as many as 54 million seeds. In the arid west, however, seeds rarely make new trees. Many scientists believe widespread quaking aspen establishment from seeds has not occurred in the western U.S. for over 10,000 years because the climate is too arid. In the more humid New England states, new aspen trees commonly start from seeds.
- A young aspen can grow 3 or 4 feet in a single summer. Females grow faster than males.
- The density of new shoots in a clone can exceed 400,000 per acre.

draft document "Classification of Wetlands and Deep-water Habitats of the United States").

In 1985 researchers from the University of Montana undertook an analysis of the river riparian zone and how it has been impacted by Kerr Dam. This study was funded by the Bonneville Power Administration and was part of a larger study on bald eagles, ospreys, and semiaquatic furbearers. The Montana Riparian Association at the University of Montana carried out a portion of the investigation. Their analysis included (1) a discussion of the impacts of Kerr Dam on pioneering species (cottonwood and sandbar willow) within the corridor; (2) an analysis of changes and losses in the riparian zone due to the dam; and (3) a determination of the total acreage of the riparian zone using both pre- and post-dam aerial photography. The remainder of the analysis included a description of riparian vegetation within the area between the low and medium flow shorelines, between the medium and high flow shorelines and above the high flow shoreline.

The most notable study conducted on river corridor vegetation is an extensive analysis carried

out from 1983 to 1987 as a part of a Bonneville Power Administration funded investigation on breeding Canada geese. This work defined vegetative cover types based on structural differences in plant cover. Site data included location, transect, bearing, distance to and above or below the high water mark, slope, aspect, elevation, canopy cover of plant species, cover types adjacent to the site, impacts of grazing or fire, and U.S. Fish and Wildlife Service wetland classification. The analysis included submerged aquatic vegetation; however, agricultural lands and homesites were excluded. Riparian habitats were mapped to the nearest 0.1 acre on 6792 acres and upland habitats on more than 7410 acres adjacent to riparian areas. Maps were digitized into a computerized mapping system (Geographical Information System's Map Overlay Statistical System).

National Wetlands Inventory (NWI) maps were produced for the Flathead Indian Reservation in 1992 under a cost share agreement between the tribes and the USFWS. (They are currently being updated.) NWI maps are at a scale of 1:24,000 and show the location, shape, and characteristics of wetlands and deepwater habitats (figure 3.15).

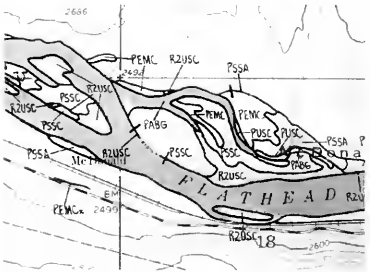


Figure 3.15. An example of a National Wetlands Inventory (NWI) map. This one is for the McDonald reach of the Lower Flathead River below Dixon.

In addition to these studies, the Soil Conservation Service maintains clipping sites at six upland locations within the river corridor for which they periodically record production and composition data. The CSKT Weed Management Program is currently mapping noxious weed infestations throughout the corridor and is developing treatment prescriptions for individual control projects.

Aerial photography of the river corridor useful for analysis of the vegetation resource and the changes it has undergone includes black and white 1934-35 photos in scale 1:16,200 for river mile 7 to river mile 11, 1944 photos in scale 1:20,000 river mile 11 to river mile 25 and 1937 photos in scale 1:20,000 (river mile 25 to river mile 32), U.S. Army Corps of Engineers 1976 photos in scale 1:24,000 for river mile 72-25 and 1978 photos flown in scale 1:24,000 for river mile 25-0, and 1981 natural color photos in scale 1:24,000.

Common Trees and Shrubs Found Along the River

Trees

Sx^{w}ex^{w}ʔénčʃ/ Kaɬ a·wu·k **(Douglas Hawthorn, a.k.a. Black Hawthorn)**
(*Crataegus douglasii*)

Black hawthorn is usually a shrub, but under favorable conditions it can become a small tree. It has a round-topped crown with spreading branches that slant upward. Usually, it has thorns.

Leaves: Broad, ovate, thick, somewhat leathery; round or pointed at the tips; wedge-shaped at the base, coarsely sawtoothed toward the tips, dark green above, paler below.

Fruit: In Salish the fruit is called sx^{w}eʔné. About ½ inch in diameter, usually in clusters of eight or 10, the flesh sweet and succulent; containing about five seeds.

Bark: Gray, or shiny-red to brown on young twigs.

Interesting Point to Discuss with Students or Build Activities Around: Leaves of black hawthorn are often spotted with orange-colored, diseased areas. This rust disease spends part of its life on hawthorn and part on the juniper, where it has a conspicuous, slimy growth in the spring when discharging spores. This slimy growth later becomes a gall.

Common Trees and Shrubs Found Along the River (cont.)

Mulš or Cek^{w}yé/ Kanuł maquł aqpi·k **(Black cottonwood)** (*Populus trichocarpa*)
Black cottonwood, which grows up to 120 feet, is the largest of Montana's cottonwoods. Its trunk is commonly free of branches up to one-half its height. It has broad, oval-shaped crowns when grown in open sites. It grows on moist soils along the river.
Leaves: 3 to 7 inches long and 3 to 4 inches wide; broad, rounded at base; thick, leathery; deep, shiny green on the upper surface, very veiny and silvery white on lower surface.
Bark: Smooth and greenish on young stems; becomes gray and sharply furrowed, 1 to 2.5 inches thick as the tree ages.
Interesting Point to Discuss with Students or Build Activities Around: The sap from the cottonwood was highly valued and the wood is ideal firewood. A cottonwood bud mixed with blood makes permanent black ink.

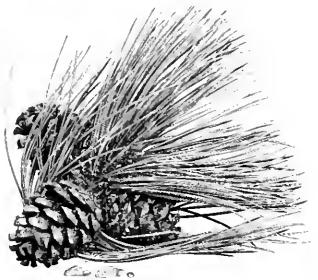
čq^{w}tn̓álq^{w}/ ʾa·kuwał wu·k **(Paper birch)** (*Betula papyrifera*)
Paper birch grows 60 to 80 feet tall and cannot stand shade.
Leaves: Ovate, 2 to 5 inches long and 1 to 2 inches wide, usually rounded at the base, margins densely toothed; dark green and shiny above, yellow-green below.
Bark: Cream white; separating into thin, papery layers, marked by long, narrow, horizontal, dark, corky lines; inner bark orange.
Interesting Point to Discuss with Students or Build Activities Around: It is used by Indians for making canoes and baskets.

Ssx^{w}ʾula/ Mɨǵkik **(Rocky Mountain Maple)** (*Acer glabrum*)
This species is a shrub or small tree 20 to 30 feet tall with a trunk diameter up to 8 inches. It often grows along mountain streams and on sides of canyons. Rocky Mountain maple, often called dwarf maple, is a striking feature of mountain sides in autumn after the leaves have taken on their varied coloration.
Leaves: 2 to 4 inches broad, about as long as broad, rounded in outline, distinctly divided into three to five lobes; thin, dark green above, paler below.
Fruit: Symmetrically double, slightly spreading with elongate, broadened wings, ¾ to 1 inch long, often rose-colored in summer.
Bark: Thin, smooth, dark red-brown.
Interesting Point to Discuss with Students or Build Activities Around: Brilliant red, thickened areas, resulting from mite damage, are very common on Montana Rocky Mountain maple leaves. Some women used the red bark as hair dye. Also used to make arrows.

Illustrations and text for this section based on Montana State University Cooperative Extension Service, *Trees and Shrubs in Montana*, Bulletin 323, Bozeman, MT, rev. ed. 1985.

Water Birch (*Betula occidentalis*)
This is a shrub or small tree 20 to 25 feet tall, sometimes called red birch, that grows along stream courses and on moist sites. It has a broad, open crown with graceful, ascending branches. Frequently, it is found in dense thickets.
Leaves: Ovate, margins evenly or doubly toothed, thin and firm; dark green above, pale yellow-green below. Leaf stalk rather thick and short, stout, 1/8 to 1/2 inch long.
Bark: Thin, 1/4 inch thick, smooth, lustrous, dark bronze, with horizontal corky lines.

Punłp/ ʾa·kuk̓pɬ uɬ aɬ **(Rocky Mountain Juniper)** (*Juniperus scopulorum*)
This tree varies from a bushy shrub to a tree 50 feet tall. The trunk is short and stout, often divided near the ground. The crown is generally dense, although the branches may become long, slender and drooping. These trees often are infected by a rust fungus that forms galls 1/2 to 1 inch in diameter.
Leaves: Scale-like, about 1/8 inch long, pointed; arranged in opposite pairs along the stems; ashy green on some trees, green or yellow-green on others; branchlets slender. Juvenile leaves awl-shaped.
Cones: Berry-like, one or two seeded, blue-green or green about 1/4 inch in diameter, take two years to mature.
Bark: Thin, fibrous, stringy, red-brown or gray-brown in color.
Interesting Point to Discuss with Students or Build Activities Around: The wood was used for lance shafts and bows, and the needles were burned ceremonially. Tea could be made from the boughs and branches to treat colds.



Sʾâtq̓ʷɪp/ Himu **(Ponderosa pine)** (*Pinus ponderosa*)
Ponderosa pine grows from 50 to 180 feet tall. The young trees are often called "black jack" or "bull pine," and the older trees, "yellow pine."
Needles: Three needles or sometimes two in each bundle, usually 4-7 inches long in tufts at the end of the branches.
Cones: 3-6 inches long, broadly rounded at base, tapered to the tip, short and squat; bright green, becoming reddish brown as they get older. They are armed with small spines.
Bark: Dark on small trees, cinnamon-brown to orange-yellow, thick and broken into large, flat, irregular "jigsaw puzzle-shaped" plates on old trees.
Interesting Point to Discuss with Students or Build Activities Around: Ponderosa pine is the state tree of Montana. Its bark has a molecule that is very similar in its makeup to the molecule that makes up vanilla, and the bark, especially on a warm sunny day, smells like vanilla.

Cc̓ɐlp/ ɬ.u **(Douglas-fir)** (*Pseudotsuga menziesii*)
Although it is a very large tree in coast areas, Douglas-fir seldom grow taller than 130 feet in Montana. Douglas-fir is used extensively for Christmas trees, lumber, and plywood in this state. Its terminal buds are pointed.
Needles: .75 to 1.25 inches long, single, flat, slightly grooved above and marked below with two light bands. Needles become narrow at base where they are attached to the branchlets; sharper at the end than the true firs.
Cones: 2 to 3 inches long, ¼ to 1 inch in diameter, oblong, can be identified by the three-pointed wings or bracts that stick out beyond the cone scales. Cones differ from those of true firs because they hang downward and do not shatter when they mature. Cones are distributed over all of the tree's crown.
Bark: Smooth, gray-brown with resin blisters on young trees; thick, deeply grooved, cork-like and gray-brown on old trees.
Interesting Point to Discuss with Students or Build Activities Around: Douglas-fir is really not a fir at all. Many things about it are different than the true firs, especially the cones. Because of fire exclusion, this tree has greatly expanded its distribution. It has also increased its density in many areas, which has increased the risk of forest fire and diseases. The Latin name *Pseudofsaga* means "false hemlock."

Shrubs

Stmtmni?ǎ/ Mi̓qukuɬ iɬ na **(Snowberry)** (*Symphoricarpos albus*)
Spreading shrub 2 to 5 feet tall; leaves thick, oval or round, broadly lobed or wavy-margined, mostly smooth above, sometimes hairy below, .25 to 1.5 inches long; twigs smooth; flowers white or pinkish, the petals densely hairy within, in few to several rather crowded clusters at ends of branches and in leaf axils; berries white, round or oval, ⅛ to ½ inch in diameter.

Ppo or Q̓wq̓wpúṭ/ Ł.aṁ **(Peachleaved Willow)** (*Salix amygdaloides*)
There are many kinds of native willows in Montana, but most of them do not reach tree size. Of the few species that may appear as a tree, the peachleaved willow is the most abundant and widespread. Usually 30 to 50 feet tall and as much as two feet in diameter, with rounded crowns.
Leaves: 2 to 5 inches long and $\frac{1}{3}$ to 1.5 inches wide, long, pointed; light green and lustrous above, pale and dull beneath.
Bark: Brown $\frac{1}{2}$ to $1\frac{1}{4}$ inches thick, irregularly furrowed.

Antelope Bitterbrush (*Purshia tridentata*)
Grayish green, intricately branched shrub 1.5 to 4 feet tall with brown or grayish bark; leaves small, thick, leathery, wedge-shaped, about $\frac{1}{4}$ to $\frac{3}{4}$ inch long, finely white-felty below, three-toothed at tip, side margins slightly inrolled, occurring usually in small bunches on short branchlets; flowers yellow, about $\frac{1}{2}$ inch across with five petals, grow along stems on short branchlets; fruits small, seed-like, narrowed to slender point at tip and tapering to base, borne singly or sometimes in twos. This is a very important browse species for big game, especially in winter.

Ł$\underline{\text{x}}^{\text{w}}$ło/ ʾa·kiʾł makw̓uʾk **(Chokecherry)** (*Prunus virginiana*)
Found on mountain slopes, stream borders and dry hills throughout Montana. It is more often a shrub than a tree, usually with a crooked trunk and a spreading crown; often forms dense thickets. Rarely over 30 feet tall in Montana. Leaves 2-4 inches long, 1-2 inches wide, ovate, sharp or taper-pointed at the tip, rounded at the base; margins finely toothed; dark green above, pale and somewhat hairy beneath, bearing a pair of glandular bumps on the leafstalk just below the base of the blade. Poisonous to livestock when young, but rarely eaten. Fruit is $\frac{1}{4}$ to $\frac{1}{3}$ inch in diameter, in dense clusters. Bright red, scarlet, or nearly black; thick skin, juicy; can be eaten or made into syrup, jelly, or wine. Bark is thin, red-brown, slightly furrowed with tan marks; very bitter to the taste.

Common Trees and Shrubs Found Along the River (cont.)

Ċkʷikʷ/ Yukwuˑk **(Black Elderberry)** (*Sambucus melanocarpa*)
Spreading shrub 10 to 12 feet tall, with branches reddish brown; 5 to 7 dark green leaflets, oblong, lance-shaped, 3.5 to 6 inches long, long-pointed, coarsely toothed, hairy below when young, becoming smooth later; flowers yellowish white in broadly egg-shaped clusters 2-3 inches across, about as broad as tall; berries black.

Rabbitbrush (*Chysothamnus viscidiflorus*)
Variable species and many varieties; rabbitbrush is a shrub 1.5 to 4 feet tall, stems pale green or white; leaves narrow to oblong, lance-shaped, ¼ to 2.5 inches long, one- to three-nerved or five-nerved variety, often twisted, smooth but sticky; flower heads in broad-spreading, oblong to round or flat-topped clusters, flowering branches rather glutinous; involucre about ¼ inch tall, the bracts oblong to long and narrow, boat-shaped, not ridged on back; in poorly-defined, vertical rows; flowers about five to a head; seeds usually densely hairy.

Ṗupunélp/ Kaɬ nukupqapmu puˑɬ a **(Big Sagebrush)** (*Artemisia tridentata*)
One to several-foot tall shrub with trunk or several trunk-like branches; has silver-gray to whitish foliage with dense, fine hairs; bark, dark brown to nearly black, shred-like; leaves ½ to 1 inch long, narrow, wedge-shaped, generally three-toothed, sometimes as many as five at tip; flowers four to six, sometimes nine, in small heads; heads yellowish or brownish in loose clusters 1 to 4 inches across. Mule dear eat this, as do antelope. Sage grouse, while not found on the reservation, are tied to the presence of big sage.

Téccxʷ/ Mukwuˑk **(Red Oshier Dogwood)** (*Cornus stolonifera*)
Stems bright or purplish red, pliable, sometimes tend to lodge and root at tips; 5-8 feet tall; whitish or bluish berries. Leaves opposite. Grows along stream banks or moist sites; fair winter-hardiness. Livestock eat this out of proportion to its abundance and therefore it declines under grazing pressure.

Russian Olive (*Elaeagnus angustifolia*)
Small nonnative tree with dense crown; rapid grower, adapted to a wide range of soil, both dryland and irrigated; widely used in shelterbelts throughout Montana; 30 feet in height at maturity; excellent cold-hardiness; used by wildlife. Fragrant to the point of being annoying in spring. Many people are allergic to this introduced species.

Stáq/ Sc̓umuʷwuʷk **(Serviceberry)** (*Amelanchier alnifolia*)
Height 2 to 15 feet; bark reddish brown, grayish when older; branchlets hairy; leaves oval to roundish, $\frac{3}{4}$ to 1.5 inches long, dark green, woolly or hairy underneath when young, generally becoming smooth with age; flower clusters short and dense; petals white about $\frac{1}{2}$ inch long; flower stems usually hairy or silky; berries $\frac{1}{4}$ to $\frac{3}{8}$ inch, dark purple when mature.

Ppo or Q̓wq̓wpú/ Łam̓ **(Sandbar willow)** (*Salix exuga*)
Typical willow shrub, leaves entire or nearly so with a few scattered, inconspicuous teeth, plants somewhat hairy, leaves more persistently hairy than other common willows.
Interesting Point to Discuss with Students: Sandbar willow leafs-out well after most shrubs. The leaves are timed to emerge *after* spring flooding has subsided so that the shrub avoids undue damage.

Sul̓aqeˀ/ ʾa·quwuʷk **(Poison Ivy)** (*Toxicodendron radicans*)
Trailing to erect deciduous shrub, 4 to 12 inches tall, occasionally much taller. Leaves are alternate, divided into three egg-shaped, pointed leaflets, noticably glossy and bright green, scarlet in autumn. Flowers are cream colored and cup shaped with five spreading petals. Fruit are white or yellowish white, smooth, berrylike drupes. **Caution: There is quite a bit of poison ivy along the river. Always check an area for poison ivy before sitting or picnicking (or otherwise exposing yourself).**

Wildlife

Big game species found within the corridor include white-tailed deer, mule deer, bighorn sheep, elk, moose, and black bear. Of these six species, deer are the most plentiful. In the upper half of the river (Segments One, Two, and Three) small herds of white-tailed deer and mule deer move between the upland shrub and herbaceous communities and the narrow riparian habitats of the river bottom. The brushy draws that are common in this stretch of river are used extensively by deer as travel corridors and for resting and hiding cover.

The riparian zone of the lower half of the river (Segment Four) supports small, year-round resident herds of white-tailed deer, while both white-tailed and mule deer use the uplands, with mule deer coming down to the river to drink. The south-facing slopes on the north side of the river provide winter range for mule deer herds, small groups of white-tailed deer, and elk from the Ferry Basin area.

Bighorn sheep were transplanted near Perma in 1978 and are now well established. The herd disperses over a large area during lambing, but winters on the south-facing slopes on the north side of the river from just below Perma to Paradise.

Elk visit the corridor occasionally, moving into Segments Three and Four from Ferry Basin, the Salish Mountains to the north and the Magpie-Seepay area to the south. Most of their use is restricted to the upland zone where they feed on native grasses.

Moose from the Revais, Magpie, and Seepay drainages occasionally travel into riparian areas along this same stretch of river. It is believed that this was the traditional winter range for these populations. However, moose sightings are now rare, probably due to hunting pressure and limited moose numbers.

Black bears occur throughout the corridor. Their densities are highest in the wetter and brushier riparian areas of Segment Four where favored foods are abundant and there is adequate cover. Many of the larger ponderosa pine trees have claw marks on their trunks from black bears.

Coyotes, red foxes, bobcats, mountain lions, raccoons, striped skunks, badgers, and long-tailed weasels are considered more or less common animals in the corridor. Each of these carnivores occupy specific upland niches, although all, with perhaps the exception of badger, frequent the riparian zone.

Semiaquatic furbearers within the corridor include beavers, muskrats, mink, and river otters. Sign surveys carried out from 1985 to 1988 indicate that, in general, furbearer density is low on the upper half of the river (Segments One, Two, and Three). Beavers are the most abundant furbearer on these upper segments, although their populations are limited by a lack of suitable habitat (in 1991 there was only one beaver colony in this stretch of river). It is interesting that on the Lower Flathead River,

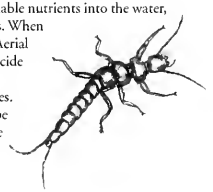
The Roots of the River

Until recently, river ecologists believed they had described most of the invertebrates living in the rivers of temperate North America. Then limnologist Jack Stanford discovered the complex communities dwelling in the gravels beneath the floodplains. Whereas some of the organisms, such as stoneflies, spend a portion of their lives in this underground world, many of the creatures—primitive worms known as archiannelids, crustaceans called bathynellids, half-inch-long blind shrimplike creatures called amphipods, and an assortment of microorganisms—never come to the surface at all but spend their entire lives deep in the water-saturated gravels under the river. Stanford and other researchers studying a section of one mountain floodplain in Montana discovered over eighty such creatures, about half of them new to science.

The channels of mountain rivers and streams typically alternate between narrow canyons and broad floodplains. In the canyons or narrows, the bedrock converges on the river and constrains its flow. In the floodplains, the bedrock recedes and is replaced by a porous mixture of gravel, sand, mud, and rock, which the river meanders across. Much of the water, up to 20 percent, moves downward into the gravels beneath the floodplain. When the floodplain ends and bedrock again restricts the river's flow, those subterranean currents resurface, bubbling up in the form of springbrooks. The water returns to the river via overflow channels. Thus each river is really two rivers moving together and constantly interacting, one on the surface and one below.

The newly discovered community of invertebrates dwells in this subsurface flow. A film of fungi and nitrogen-fixing bacteria coats the alluvial gravels. Supported by dissolved organic matter carried by the river, this film is itself grazed by higher organisms—the archiannelids, bathynellids, and amphipods. They, in turn, are food for inch-and-a-quarter-long ivory-and-cream-colored stonefly larvae, ghostlike creatures that spend years hidden beneath the floodplain before emerging on the river as adults. As adults, the stoneflies live a few weeks, just long enough to mate.

This underground food-chain influences life within and adjacent to the aboveground portion of the river. As the organisms process the dissolved organic matter, they release large amounts of previously unavailable nutrients into the water, especially phosphates and nitrates. Relatively infertile water becomes charged with nutrients. When the currents emerge on the surface, they fertilize the riparian growth of the floodplain. Aerial photographs show that, generally, the most productive, vigorous plant communities coincide with upwellings and springbrooks.



By feeding the floodplain, this subterranean community nourishes hundreds of species. Riparian plant communities support more bird and mammal species than any other type of habitat. Trout, salmon, and whitefish favor the springbrooks as spawning habitat; the constant upwelling of nutrient-laden water nourishes the fry when they hatch. From Montana to Alaska, the combination of spawning trout and lush vegetation draws grizzly bears, bald eagles, cormorants, mink, and otters.

What Kind of House?

Good, secure den sites for beaver provide escape cover, resting and grooming areas, protection from predation, thermal protection during winter, and safe places for kit rearing. But just like humans, beavers build different kinds of homes. A study on beaver living on the Lower Flathead River identified three types of beaver houses.

- Bank dens—dens excavated into the river bank with an underwater entrance leading to an underground chamber (except during low flows, these dens can be very difficult to detect);
- Lodges—free-standing structures surrounded by water and constructed out of branches and mud;
- Stick-bank dens—hybrids of bank dens and lodges, usually these consist of a large stick and mud structure built against the river bank that covers chambers excavated into the bank;
- Other—dens that do not fit into the other three categories and are constructed out of riprap, built within culverts, or beneath fallen trees.

In the beaver study on the Lower Flathead, bank dens were the most numerous type of den. Stick-bank dens and lodges are difficult to maintain on a large river like the Lower Flathead where high flows can destroy these dens by dislodging and washing them downstream. All active lodges were located in side channels where river flows were moderated. Stick-bank dens were generally located in deep, slow-moving eddies where they were protected from the main current behind point bars or rock outcrops. Even though bank dens were the most numerous, beaver preferred stick-bank dens and lodges. Both types of structures served as important winter colony sites and were important dens during low flows. During high flows when lodges and stick-bank dens flooded, beaver used bank dens or old lodges located in dry river channels or on high ground. In general, beavers favored areas with deep water, low velocities, and fine substrates for digging. Most homes had entrances at several water levels so they can always enter underwater.

Sqléq/ Sina (Beavers) Helped Shape the Continent

Before Europeans arrived in North America, beavers numbered (depending on the expert consulted) between 60 and 400 million. Populating virtually every stream in North America from the Arctic to northern Mexico, beavers altered the courses and flows of streams and the composition and diversity of plant and animal communities.

Beavers build lots of dams when their populations are high—twenty or more beaver ponds per mile of stream is not unusual when the topography and food conditions are right. Beaver dams increase the amount of beaver habitat and reduce the threat posed to beavers by predators. The dams also trap sediment. A small beaver dam will contain as much as 230,000 cubic feet of sediment. Full of carbon and nutrients, the sediment helps to stabilize communities, which is partly why stream bottoms with beaver ponds respond more quickly after disturbances like fire.

Beaver ponds also affect aquatic organisms. Whereas an undammed stretch of stream might support mostly blackflies and the kinds of midges, mayflies, and caddisflies that favor moving water, an equivalent segment of stream with a beaver pond will harbor those same species along with an assortment of slack-water midges, dragonflies, aquatic worms, and filtering clams. A section of stream with beaver ponds will support two to five times the number of invertebrates.

Beavers harvest trees and shrubs to build dams. A single beaver family will cut over a metric ton of wood per year within 100 yards of their pond. In addition, the ponds themselves flood and kill many trees and shrubs. Removing all that vegetation transforms the riparian zone. In northern areas, the beavers cut trees like aspen, birch, and cottonwood. Shrubs like alder and hazel and young aspen trees sprout up in response. Ultimately, black spruce and balsam fir, species the beavers avoid, replace the shrubs. These changes in the plant community attract a different set of insects, birds, and mammals. Stream temperatures change too, because of reduced shading. Communities of aquatic organisms are altered in turn.

Beavers also influence the way nitrogen is cycled in and around streams. Research shows that plant-available nitrogen is four times greater under the kind of flooded and waterlogged conditions beavers create. In one study, usable nitrogen, often a limiting nutrient in fresh water systems, doubled over a forty-five-year period as a direct result of the wetlands created by beavers.

The fast-moving streams that we know today looked very different when beavers reigned. Ponds bordered by open canopies dotted the streams then, and along the stream banks stood flooded forests, marshes, and bogs. Although beaver populations in most areas are but a fraction of what they once were, the legacy of the animal remains in the stream channels and the plant and animal communities we see today.

beavers eat more red-osier dogwood than elsewhere. One reason for this may be that Kerr Dam has reduced the foods beavers generally prefer—aspen, willow, and cottonwood. Raccoons are common on the upper river, while surveys have found very little mink and no muskrat sign there.

Several species of reptiles and amphibians use the riparian and aquatic habitats as well. Painted turtles inhabit backwater and slough areas and several species of snakes —including bull snakes, common and western garter snakes, rubber boas, and prairie rattlesnakes— use riparian and adjacent upland areas. Spotted frogs and Pacific chorus frogs inhabit backwater and slough areas, and bullfrogs, an introduced species, can be found in potholes along the river upstream to Dixon and maybe beyond.

Several species are currently protected by the Endangered Species Act or have recently been delisted. The grizzly bear is listed as threatened, and

the peregrine falcon and bald eagle were recently removed from the list due to recovery.

Peregrine falcons (*Falco peregrinus*) were undoubtedly once more common, but habitat destruction and the widespread use of DDT and other pesticides dramatically reduced the numbers. Since DDT has been banned in the U.S. and a captive breeding program started, peregrine falcons have increased steadily in many parts of their former range. On the Flathead Indian Reservation, the species probably inhabited portions of the Mission Mountains and Lower Flathead River. Prior to the early 1990s, peregrines were observed as occasional migrants during fall and spring, and were seen during the summer as recently as 2000. In the early 1990s two reintroduction sites were established on the reservation. Reintroduction has been successful at both of these sites, and additional nesting territories are now productive.

Twenty bald eagle breeding territories occur within the Flathead Indian Reservation. Most of these are along the Lower Flathead River, on islands or the shoreline of Flathead Lake, or along tributaries and near irrigation reservoirs. Migrant and overwintering bald eagles may number as high as 70 birds during peak periods. What eagles eat during winter and the nesting season is shown in figures 3.16 and 3.17, respectively.

Species considered sensitive within the corridor include ospreys, prairie falcons, golden eagles, and other raptors. From 1985 to 1989 the number of occupied osprey nests varied from 17 to 28 (up from 7 to 12 during the period from 1977 to 1980). Reproductive success of these birds was good during this period and indicates a stable or increasing population.

A 1985 survey found 8 prairie falcon nests over the 72 mile stretch of river, which is not considered a particularly high density. The nests were distributed throughout the corridor and were generally found on cliffs located near upland grasslands. These birds are specific in their nest site requirements and are quite sensitive to disturbances such as roads, buildings, and other structures.

Other raptors known or suspected to nest within the corridor include: golden eagles, marsh hawks, red-tailed hawks, American kestrels, sharp-shinned hawks, Swainson's hawks, great horned owls, short-eared owls, long-eared owls, and screech owls. Of these, all but the Swainson's hawk use the river as a wintering area. Merlins may nest within the corridor, and Cooper's hawks and goshawks migrate through the area and may nest there.

Several waterfowl species nest in the corridor. The most common of these are mallards, common mergansers, and Canada geese. Most waterfowl use occurs in the winter, however, and species common during these months include mallard, common merganser, Canada goose, eared grebe, common goldeneye, and red-breasted merganser. Canvasbacks, ruddy ducks, and pintails have been observed on the river but are uncommon. Tundra swans and trumpeter swans can be seen as well.

Canada geese were intensively studied most recently from 1983 to 1987. This study found

The Boreal Toad

Boreal toads (*Bufo boreas*) range from western British Columbia and southern Alaska to northern Baja California, Mexico, and as far east as Montana, western and central Wyoming, Nevada, the mountains of Utah, and western Colorado. Often found along the Lower Flathead River, boreal toads live in all sorts of habitats, from deserts (near streams) and springs, in grasslands and mountain to meadows, aspen groves, and forests. Wherever they occur, they are usually found near ponds, lakes, rivers, or streams.

Squat and pudgy, the boreal toad is one of North America's largest toads. Adults can be 5 inches long. Their color varies from dusky brown to gray-green. Like other toads, they have warts; theirs are rust-colored and ringed with black. Often, a lighter stripe extends down the length of the back. Depending on latitude and elevation, they are active from January to October. Most are diurnal during the spring and fall and nocturnal during the summer. In winter they hibernate in natural chambers near streams. The high water table, the constantly flowing stream, and the snow help maintain air temperatures within their dens at or just above freezing.

A boreal toad may live nine to ten years. Their minimum breeding age is two to three years. The timing of their egg-laying varies with elevation and weather but can occur any time between January and July. Egg development depends partly on temperature, although metamorphosis is usually completed within three months of egg laying. Sex ratios differ according to habitat type; males are more numerous in wet areas, females in dry habitats.

Boreal toads eat mostly invertebrates—bees, beetles, ants, grasshoppers, spiders, crayfish, and sowbugs. They in turn often become prey to ravens and other birds, reptiles, and mammals, even though they produce skin toxins and are avoided by many predators. Tadpoles are eaten by fish, amphibians, birds, and mammals. Boreal toad populations are declining; the species has vanished in recent years from much of its range, including much of its range in western Montana. Surveys find it at fewer than 20 percent of the locations where it was common a decade or two ago.

Snaƛ̓ƛ̓áne²/ Ku-ku *Boreal toad*

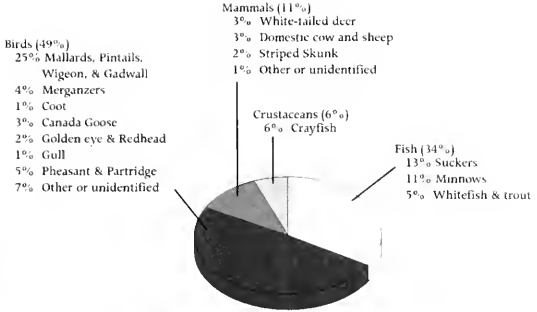


Figure 3.16 Proportion of food items in the diet of wintering bald eagles, 1986-88.

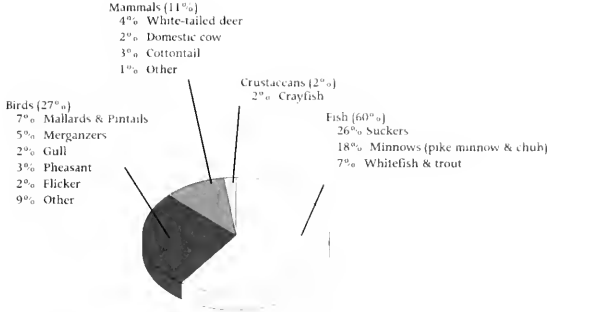


Figure 3.17 Proportion of food items in the diet of nesting bald eagles, 1986-88.

that approximately 150 geese were using the river in the spring and early summer for nesting and raising broods. Four major brood rearing areas were located: one in river Segment Two (at river mile 31.5-34.5), and two in river Segment Four (at river mile 28 and 12-13). Researchers found that most river-nesting geese leave the river as soon as their broods fledge for surrounding reservoirs where they remain until November. The reservoirs generally freeze in November. In response, river-nesting geese and most of the other geese on the reservoirs move to the river. More geese (400-1200 birds) use the river from November to February than at any other time of the year. During extremely cold winters most of the geese leave the valley altogether.

Figure 3.18 shows the numbers of Canada geese using the river each month that were reported over the course of the study. Numbers of nesting pairs have gradually increased since then.

The study also found that, prior to 1983, almost all goslings fledged along the river were produced from ground nests on islands. The population remained low, however, because fluctuating water levels resulting from the operation of Kerr Dam allowed predators access to nests. When artificial nest structures less accessible to predators were provided beginning in 1983, the population of nesting geese increased dramatically (from 25 in 1980 to 79 in 1987). The study concluded that the most effective way to increase the numbers of successfully nesting geese was to provide artificial structures. Kerr operations have now changed and water fluctuations no longer impact geese in the same way.

A number of other populations of birds depend directly on the river. Among these are great blue herons, double-crested cormorants, cliff swallows, and belted kingfishers. There are three active great blue heron nest concentrations on the river. These are relatively small and most occur in river Segment Four. Double-crested cormorants do not nest on the river. However, populations nesting at Ninepipe and Pablo Reservoirs depend heavily on the river as a fishery. Concentrations of cliff swallows are abundant anywhere clay or rock cliffs border the river, and belted kingfishers are common throughout the corridor. Ring-necked pheasants, which are not native, are the most common upland game bird in the corridor. On the upper half of the river they occupy principally agricultural lands and adjoining grasslands. On the lower half they use agricultural lands, brushy riparian areas, wetlands, and more densely vegetated islands. Ruffed grouse occur in Segment Four wherever mixed deciduous-coniferous forests with dense undergrowth are found. Gray partridges are common in upland areas.

Past Studies

Several wildlife studies have been completed in recent years. Among these are two Bonneville Power Administration (BPA) funded investigations on the impacts of regulated water levels on semiaquatic furbearers, bald eagles, and ospreys.

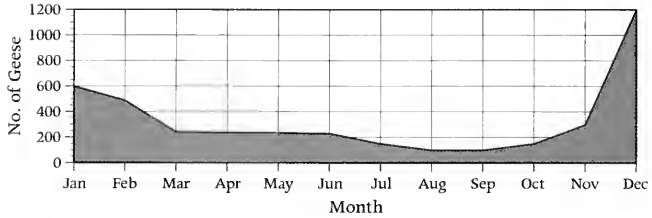


Fig. 3.18. Number of Canada geese observed during aerial surveys 1983-1987.

The furbearer study, conducted from 1985 to 1989, included sign surveys to provide a general idea of the numbers and distribution of beavers, otter, mink, and muskrats on Flathead Lake and the Lower Flathead River. It also included an overall assessment of the beaver population: determining the type of dens used and den entrance characteristics; documenting the importance of various shrub species as winter forage; analyzing the relative importance of various environmental parameters around winter colonies; documenting beaver movements related to river discharge; and assessing the impacts of Kerr Dam operations on beaver and their habitat.

The raptor study, which was also done on the lake and river, included investigations of: (1) the reproductive success of both ospreys and bald eagles; (2) the movements, foraging success and food habits of breeding ospreys and bald eagles; and (3) the ecology of wintering bald eagles. Both the raptor and furbearer studies formulated mitigation and management recommendations to protect and enhance osprey and bald eagle populations. Tribal wildlife biologists continue to monitor the reproductive status of these two species on an annual basis.

The BPA funded an investigation of Canada geese from 1983-1987. The study area included the south half of Flathead Lake, the Lower Flathead River, and various reservoirs in the Lower Flathead Valley. Researchers examined population distribution and seasonal movements, described habitats, surveyed territorial pairs, compared the use of artificial nesting structures with natural nest sites, analyzed environmental parameters of nest sites, described habitat selection by broods, located important brood areas and potential brood areas, analyzed various environmental parameters of brood rearing areas, and documented historical trends in the availability of brood habitat. This study also formulated management recommendations to protect and enhance Canada goose nesting and brood rearing.

Other wildlife studies and reports include: (1) a 1991 survey of non-member bird hunters who purchased reservation bird stamps; (2) a 1990 broad-based literature review of reservation mammals and birds known to occur on the reservation; (3) a 1984-1985 survey of prairie and peregrine falcon nesting sites and an evaluation of falcon breeding habitat; (4) a 1984 BIA-funded survey of furbearers on the lake and river; (5) a BIA and U.S. Fish and Wildlife Service (FWS) study on the reproductive success of ospreys nesting on the lake and river which ran from 1979-1983; (6) a FWS report summarizing potential impacts associated with proposed hydropower developments on the river (reporting the results of winter wildlife surveys conducted from 1977 to 1979 and a wetland inventory); and (7) a series of studies conducted by the Craigheads and others on Canada geese (these included evaluations of aerial nesting platforms, measuring hunting pressure and studies of productivity and biology).

The Subspecies of Canada Geese (*Branta canadensis*)

The weights of the eleven recognized subspecies of Canada geese range from 3 pounds for the cackling Canada goose (*B. c. minima*) to 11 pounds for the giant Canada goose (*B. c. maxima*). The large-bodied subspecies are mainly continental in distribution, while the small-bodied ones breed in coastal Alaska and Arctic Canada. Recent genetic studies of the subspecies indicate that all subspecies shared a common ancestor about 1 million years ago. The subspecies of Canada Geese are listed at right.

Large-Bodied Canada Geese

Atlantic Canada Geese (*Branta canadensis canadensis*)
Hudson Bay or Interior Canada Geese (*B. c. interior*)
Giant Canada Geese (*B. c. maxima*)
Western or Great Basin Canada Geese (*B. c. moffitti*)
Vancouver Canada Geese (*B. c. fluva*)
Dusky Canada Geese (*B. c. occidentalis*)

Small-Bodied Canada Geese

Baffin Island Canada Geese (*Branta canadensis hutchinsii*)
Taverner's or Alaskan Canada Geese (*B. c. taverneri*)
Cackling Canada Geese (*B. c. minima*)
Aleutian Canada Geese (*B. c. leucopareia*)
Lesser or Athabasca Canada Geese (*B. c. parvipes*)

Ruffed Grouse

The natural distribution of the ruffed grouse is almost identical to that of the quaking aspen, an indication of the extent to which the bird relies on the tree for food. Aspen grows along the river, so as you might expect, ruffed grouse can be found there, too, especially along Segment Four.

A bantam-chicken-sized bird, the ruffed grouse has a variegated plumage—shades of gray flecked with reds, browns, and black—an ideal camouflage for the habitats it occupies. Males bear a red patch of skin above the eye, and both sexes carry dark shoulder patches. The tail of the ruffed grouse is barred with tones of red or shades of gray.

Mating and courtship begin in April when males "drum" to attract mates. Drumming consists of a series of low-pitched, hollow-toned thumps generated by rapidly beating wings. Such low-pitched sounds are directional and carry well through the dense thickets the grouse inhabit.

Females nest on the ground in dense, pole-sized stands of aspen or other hardwoods. They lay from eight to fourteen eggs. The eggs hatch between May and June. Usually only three or four of the chicks survive their first summer. The chicks are precocial, meaning they are covered with down and are open eyed and mobile the minute they leave the egg.

Females range over about 100 acres, males only over about 10. Both sexes eat a variety of foods—fruits, nuts, twigs, leaves, and flowers from shrubs, forbs, grasses, and trees. The chicks feed heavily on insects and other small invertebrates. Ruffed grouse themselves fall prey to humans, wolves, coyotes, foxes, cougars, lynx, bobcats, hawks, falcons, owls, eagles, snakes, skunks, weasels, and other small carnivorous mammals—about 55 percent of the fall population dies each winter.

Past graduate studies on wildlife include a 1964-1966 Master's thesis study of reservation big game populations, habitat and utilization by tribal members (the first systematic study of big game on the reservation); a Master's thesis study on the biology of Canada geese in the Flathead Valley, and a Master's thesis project on great blue heron nesting habitat and the effects of human disturbance.

Periodic federal and tribal wildlife surveys that encompass the river include: (1) tribal and FWS aerial surveys conducted seasonally for Canada geese; (2) aerial and ground winter surveys and breeding surveys of bald eagles (conducted by the BIA 1976 to 1988 and the tribes from 1989 to present); (3) tribal ground and aerial surveys of osprey breeding and nest success; (4) tribal aerial surveys of nesting peregrine falcons and other raptors; (5) winter helicopter surveys of ungulates; (6) spring aerial surveys of the Perma bighorn sheep herd; (7) waterfowl hunter surveys from check stations at Ronan, Polson, and Ravalli; and (8) beaver cache counts.

More than Meets Our Eyes

Kestrels, which occur throughout the river corridor, seem to have an almost mystical ability to detect areas with lots of mice.

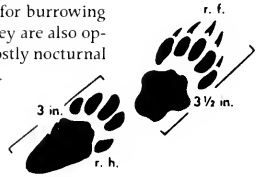
Often we make assumptions about the natural world based on our perceptions and miss what's actually happening. Hawks and falcons have long been recognized for their remarkable eyesight—their ability to discern even tiny animals at great distances. Visual creatures ourselves, we've assumed that birds of prey see the world as we do, only better. Large regions of the landscape may support only meager populations of mice and voles, while other places harbor concentrations. Raptors seem to possess a sixth sense in finding places where the populations of these creatures are highest. Many raptors hunt and build their nests in these areas. Until now, our assumption has been that birds of prey, at least those that hunt mice and voles, simply flew about until they spotted large numbers of rodents scurrying through the fields, or they looked for concentrations of other raptors as a signal.

But recent research on kestrels shows that raptors may be relying on a perception outside the realm of human experience. Voles, one of the kestrel's main prey, leave behind trails of urine and feces. Their inch-wide posteriors are soaked with urine. As they travel their complicated network of trails, the urine smells inform them who traveled where and when, much the way scent-posts signal information to packs of wolves.

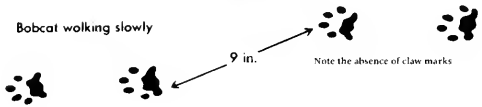
These urine trails are visible in ultraviolet light at a part of the electromagnetic spectrum visible to kestrels but not to humans. Thus, for kestrels, and perhaps for a number of other rodent-hunting raptors, recently used vole runways stand out like neon—the equivalent of highway billboards. Ultraviolet vision enables them to evaluate large areas in a short time.

River-bank Critters: A Tracker's Guide for the Lower Flathead River

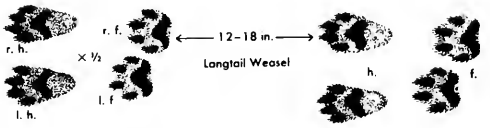
Siɣʷiyɣʷo/ Naɬ mit̓ **(Badger)**
Taxidea taxus
Badgers like open grasslands and shrub grasslands. They favor non-forested habitats with soils suitable for burrowing and that support plenty of prey. They are tremendous predators of digging rodents and rabbits, but they are also opportunistic and will eat non-digging mammals, birds, eggs, reptiles, amphibians, and plants. They are mostly nocturnal but are also active during the day. Babies are born from February to May and have litters of one to four.



Snqcups/ K̓aƛ̓ɣu pus **(Bobcat)**
Lynx rufus
Bobcats use a wide variety of habitats. They like rimrocks and grassland/shrubby areas with dense understory vegetation and lots of prey. They den in rocky areas and eat mostly snowshoe hares and jack rabbits, although they'll eat any rodents or birds they can. They are primarily nocturnal, mate in the spring, and average 2 to 4 offspring.

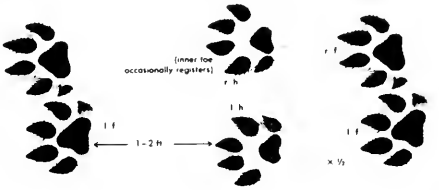


ɬc̓im̓/ ʔi·katitaɬ **(Short-tail Weasel and Long-tail Weasel)**
Mustela erminea and *Mustela frenata*
These two species of weasel differ in size but they overlap in the kinds of habitat they prefer. The short-tail is just 7 to 13 inches long; the long-tail 11 to 16.5 inches. Both inhabit brushy or woody areas close to water and avoid dense forests, although the long-tail can be seen in just about any kind of habitat that is near water. The smaller of the two, the short-tail, eats mostly voles; the long-tail eats any kind of small mammal up to rabbit size as well as birds and other animals.



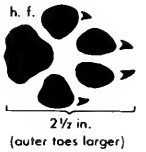
Much of the text in this section is adapted from "Identification of Montana's Furbearing Mammals" by Michael R. Frisina and Kurt Alt, *Montana Outdoors*, vol. 23, no. 3 (May/June 1992), pages 11 to 26. Illustrations by Robert Neaves. Used with permission.

Cx̓ĺé/ɬinuya **Mink**
Mustela vison
Mink, semiaquatic foragers, are usually found along streams and lakes, often where you find muskrats. They eat small mammals, birds, eggs, frogs, fish, and in the summer, waterfowl. They often kill prey larger than they are. They mate from January to March and average four to five offspring per litter.

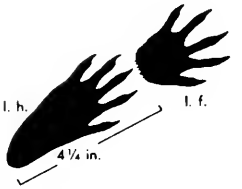


X̱ʷaẋʷaá/ Na·k̓yu **(Red Fox)**
Vulpes vulpes
Foxes use a range of habitats and are often found around agricultural land. They prefer a mix of forest and open country near water. They are opportunistic, mostly nocturnal predators that hunt by smell and eat small mammals, birds, and eggs. Their litters average four to eight.

Snc̓ĺé/ Skinkuȼ **(Coyote)**
Canis latrans
Coyotes utilize almost any kind of habitat where prey is readily available, although they prefer prairies, open woodlands, and brushy or boulder-strewn areas. They eat mammals, fawns, plants, birds, and invertebrates. During winter, coyotes often prey on deer. They are mostly nocturnal, breeding from January to March, and giving birth to from four to seven pups.

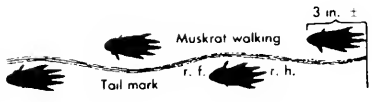


Mhuyeʔ/ Namqatku **(Raccoon)**
Procyon lotor
Raccoons live in steam and lake borders near woodlands or rocky cliffs. They are most abundant in riparian and wetland habitats, are generally nocturnal, and very intelligent. They breed during February and March and bear two to four young in April or May.

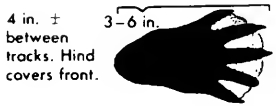


χstéyy̓eʔ/ Xaxas **(Striped Skunk)**
Mephitis mephitis
Skunks live in a variety of habitats, including semi-open country, mixed woods, brushlands, and open prairie. They are most abundant in agricultural areas. They eat mice, insects, eggs, berries, and carrion. In winter, when food is scarce, skunks spend extended periods in their dens, although they do not hibernate. They mate from February to April and bear five to six kittens in May or June.

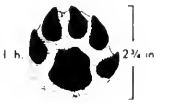
čč̓éxʷ/ Hanq̓u **(Muskrat)**
Ondatra zibethicus
Muskrats are really large voles adapted to aquatic conditions. Their name comes from the musky secretins that come from their perineal glands. They are the most widespread of North American microtine rodents (a subfamily of mice). They live in marshes, at the edges of ponds, lakes, streams, and rivers and in thick stands of cattails and rushes. Water has to be deep enough or moving fast enough to prevent freezing. They are primarily herbivorous and eat shoots, roots, bulbs, and leaves of aquatic plants. They build dome shaped houses and have two or three litters a year.



Sqlé́w̓/ Sina **(Beaver)**
Castor canadensis
Beavers occupy a variety of habitats. Even though native to the river, when Kerr Dam was operated as a peaking facility, they contributed to the shift in river vegetation away from the natural cottonwood gallery and mixed conifer-deciduous forests to conifer-dominated forests. Their impact on river vegetation under Kerr Dam's new operating guidelines is still unknown. Beavers are strict herbivores. Willows, aspen, cottonwood, and alder are important foods. They breed from January to March and have one litter of two to four a year.



Ltk^{w}ups/ ʾaqawxaɬ **River Otter**
Lutra canadensis
Otters are aquatic animals that inhabit streams, rivers, and lake borders. They use bank dens created by beavers; their dens have entrances below the water surface. Their diet is mostly fish, but they eat just about any other aquatic organism. Active day and night, otters are sociable creatures. They breed in the spring and have a 9.5 to 10 month gestation period. Litter sizes of two to three is most common.



Nƛámqeʔ/ Nupqu **(Black Bear)**
Ursus americanus
Black bars favor a mosaic of open meadows, swamps, berry patches, and forests. During the winter months, they den in dense brushy thickets, dead fall, hollow trees, caves, and underground chambers. Black bears are omnivores and tend to be opportunistic in their feeding habits. Plant foods like berries, roots, succulent greens, and pine nuts make up the major part of their diet. They prefer any plant or plant fruit that is high in sugar content. They also eat insects, small rodents, carrion, and given the opportunity, will kill young deer, elk, and even moose. In the middle of winter while still in the den, females give birth to one to five cubs, though two is the most common number. The cubs stay with their mother until their second spring, then disperse before she mates again.

Amphibians

Šlšlčé [Salish] **(Long-toed Salamander)**

Ambystoma macrodactylum

Grey to dark brown to black with silvery speckling along sides. Yellow, tan, or olive-green uneven sometimes broken dorsal stripe. 3.2 to 4.7 inches. Long-toed salamanders lead a subterranean life in habitats from semiarid sagebrush deserts to montane meadows and a wide variety of intermediate habitats. Adults are active above ground during migration to their breeding waters, ponds, lakes, temporary pools and livestock ponds in late February to early April, often before the snow melts. At higher elevations (up to 9100 feet elevation) the larvae over winter, and metamorphosis occurs the following year. The Montana subspecies is *A. m. krausei*, the northern long-toed slamander.

Łmłaḿá/ Watak **(Pacific Tree Frog)**

Pseudacris regilla

Small with no toe pads. Dark stripe from snout to groin along side and through eye. Dark stripes on back. Body color from gray to brown, olive to green. Size is 1.3 to 2 inches. They inhabit damp marshes, grasslands, and woods and use temporary and permanent waters for breeding. This frog may not always be seen but is often heard. The "prreep-prreep" mating call is uttered day and night and abruptly stops when the frog is approached. The Montana subspecies is *P. r. regilla*, the Northern Pacific Tree Frog.

Łmłaḿá/ Watak **(Columbia Spotted Frog)**

Rana leteiventris

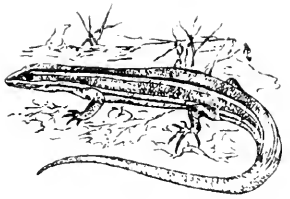
Gray to light brown to dark brown with dark spots with light centers. The undersides of rear legs are orange to red, sometimes yellow. 2 to 4 inches. Found in marshy edges of ponds and lakes among emergent vegetation, irrigation ditches, and slow moving streams. They mate in late March or early April while skim ice is still forming at night. Their call is a rapid, low-pitched croak without much carrying power. Like most frogs, Spotted frogs do not survive well where bullfrogs have been introduced.

Text and graphics in this section are from "The Reptiles and Amphibians of Lolo National Forest" by Sam Mano (Lolo National Forest Pamphlet, Missoula, Montana, undated, 9 pages). Illustrations © by Pat Bartholomew. Used here with permission.

ɬmɬaḿá/ Watak **(American Bullfrog)**
Rana catesbeiana
Largest frog in Montana. Olive green or brown with a light underside. 3.5 to 6 inches. Highly aquatic, bullfrogs inhabit quiet permanent waters with emergent and/or submerged vegetation. Males are highly territorial during the summer breeding season. Their calls are a deep bass "brwum" with great carrying power. A male's tympanum is larger than its eye; a female's is about the same size as its eye. Bullfrogs have been introduced west of the continental divide and are not native to the Lower Flathead River. Where they have been introduced, the spotted frog and other frogs have declined in numbers or disappeared. They eat anything small enough to fit into their mouths including other frogs, mammals, birds, snakes, and turtles.

Snakʷkʷaneʔ/ Ku·ku **(Western Toad)**
Bufo boreas
The only toads found on the river. Green to gray to brown warty skin with a white or cream-colored mid-dorsal line. 2.5 to 5 inches. Generally found near water, they occur in a wide variety of habitats from sage brush deserts to montane meadows. Males' voices sound like the peeping of baby chicks. Tadpoles swarm by the thousands, stirring up detritus on which they feed and can be seen close to the edges of ponds in the spring and summer. Montana subspcies is *B. b. boreas*, the Boreal toad. Considered as a "species of concern" in Montana due to the few known breeding populations.

Reptiles



šišǐčé [Salish] **(Western Skink)**
Eumeces skiltonianus
Shiny smooth-scaled, quick lizards with bright blue tails, especially juveniles and subadults. Tails fade to blue gray or brown in adults. Golden brown dorsal stripe bordered on either side by a tan stripe. 7 to 10 inches. Diurnal. Found in rotting logs, rock slides, surface litter, and large flat stones in arid canyons, open woodlands, and forests. Females lay and guard eggs from July to August. When attempting to capture and observe the western skink be careful, the tail breaks off easily. The tail regrows, but it costs the animal considerable energy that would be better used for reproducing or foraging. The subspecies found in Montana is the *E. s. skiltonianus*, or Skilton's skink.

Amphibians and Reptiles: A Guide (cont.)

Rubber Boa
Charina bottae
Rubber boas resemble giant earthworms and look and feel rubbery. Uniform brown to olive green dorsally and yellow underneath. 14 to 30 inches. Rubber boas inhabit a range of environments and are frequently encountered along trails that follow mountain streams. Crepuscular, nocturnal, and fossorial, these accomplished burrowers may be observed on the surface during the day after a warm summer rain. They feed on small mammals and their young, birds, salamanders, and snakes, which they kill by constriction. In September, 2 to 8 young are born alive. This snake's blunt tail is used to confuse predators. When threatened, it coils into a ball hiding its head inside and sticking its tail into the air. Montana subspecies is *C. b. bottae*, the Northern Rubber Boa.

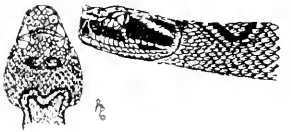
Npƛáċeʔ [Salish] **(Eastern Yellow-bellied Racer)**
Coluber constrictor flaviventris
Slender fast moving. Brown, olive, or bluish gray dorsally, yellow belly. Length is 23 to 48 inches. Found in open areas, meadows, grasslands, sage deserts, semiarid to moist. Absent in very dry deserts, forests, and at high elevations. Diurnal. Racers eat insects, mammals, snakes, lizards, and frogs. Oviparous, females lay eggs in July. The young resemble bullsnakes with dark gray or brownish blotches down middle of back, which fade when snakes are approximately 18 inches long.

Sċewíleʔ [Salish] **(Common Gartersnake)**
Thamnophis sirtalis
Well defined yellow dorsal stripe with red spots or blotches along sides. 16 to 33 inches. Two subspecies occur in western Montana, the valley (*T.s. fitchi*) and the red-sided (*T.s. parietalis*). Garter snakes are the most common and probably the most frequently encountered snake in the area. Most often encountered in moist areas and near water. Diurnal. They are excellent swimmers, feeding on fish, frogs, tadpoles, salamanders, toads, worms, slugs, small mammals, and young birds. In August or September, females give birth to up to 42 live young.

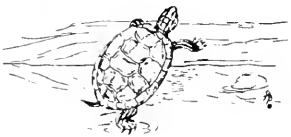
Glossary
arboreal *tree dwelling*, carapace *the top of a turtle's shell*; crepuscular *-active early morning or evening*; diurnal *active during the day*; dorsal *the back or upper surface of the body*, emergent *above the water's surface*, fossorial *burrowing*, larvae, larval *the newly hatched stage of various animals differing markedly from the adults*; metamorphosis *transformation from larval to adult form, (eg. tadpole to frog)*, neoteny, neotenic *--sexually mature and able to reproduce while retaining larval characteristics*, nocturnal *active at night*, oviparous *--producing eggs that hatch outside the body*, plastron*—the bottom, underside of a turtle's shell*, prehensile*—grasping*; scutes*—the scales that cover a turtle's shell*, subterranean *–beneath the earth's surface*, tympanum *ear*.

Sc̓wíle? [Salish] **(Intermountain Wandering Gartersnake)**
Thamnophis elegans vagrans
Uneven yellow to brown dorsal stripe sometimes absent, frequently broken up by the top row of two alternating rows of black spots that appear along the sides. 18 to 36 inches. This common snake can be found in a wide variety of habitats from moist vegetation to dry fields to coniferous forests often near water. Diurnal. They feed on amphibians, fish, mammals, birds, and lizards. Females give birth to 3 to 27 young in August or September. Has the record for the highest elevation for any Montana reptile, 9,071 feet.

Sx̓ʷnu [Salish] **(Bullsnake)**
Pituophis melanoleucus sayi or *P. catenifer sayi*
Large, heavy bodied. Cream to tan colored with light brown to dark brown or black blotches on back and sides. 36 to 110 inches. Live in virtually all types of habitats from deserts to open coniferous forests to agricultural fields. Excellent climbers. Diurnal except in hot weather when they become nocturnal. Feed on rodents, rabbits, ground squirrels, birds, and lizards, which they kill by constriction. They also eat bird eggs. In late June to early July, females lay eggs in a communal nest. Bullsnakes mimic rattlesnakes in patterning and defensive behavior, including the vibration of their tails, which can sound like the rattle of a rattlesnake. The bullsnake is a subspecies of the gophersnake.



X̌eʔulexʷ [Salish] **(Prairie Rattlesnake)**
Crotalus viridis viridis
Thick bodied with a thin neck and a triangular head. Dorsal background color is similar to the environment where they are found and can be greenish, brown, gray to brick-red. The dorsal blotches are brown surrounded by a thin, light line. 25 to 45 inches. They inhabit rocky sage deserts, grasslands, prairies, talus slopes, and forests. They prey mainly on ground squirrels, mice, rabbits, and birds, which they kill by striking and injecting with venom. 2 to 24 live young are born in September. They are, of course, venomous. A subspecies of the Western Rattlesnake. One lived in captivity for 27 years 7 months.



Sp̓lqʷá/ Kaxax **(Western Painted Turtle)**
Chrysemys picta belli
This is the only turtle native to western Montana. Carapace olive green to black. Red marks on underside of marginal scutes. Yellow stripes on neck, legs, and tail. Plastron branching red pattern. 3 to 7 inches. Can be observed stacked, basking on floating logs in slow moving streams and rivers, and lakes with soft bottoms and submergent vegetation. Females dig nests in sandy, south-facing banks and lay 6 to 21 eggs in May-July. Hatchlings overwinter in nest. Can withstand some below freezing temperatures. Males have longer claws on the forelegs than females.

Fish

The Lower Flathead River is unique in its geology and temperature regime. The river cuts through highly erosive lacustrine and alluvial sediments deposited during the lifespan of Glacial Lake Missoula. Cottonwood habitat types and a mixed deciduous/coniferous overstory has been forced toward a conifer-dominated overstory due to the elimination of periodic flooding activity and altered flows.

The river channel itself is largely unaltered by development. The railroad cut off a several meander bends or side channels between the town of Dixon and its confluence with the Clark Fork River, but the channel is considered relatively stable. In terms of fish habitat, the river under the new baseload operations provides nearly what it did historically. Current impacts to fish habitat quality include bank trampling and vegetation disturbances from grazing and elevated fine sediment input and temperatures from its major tributaries and irrigation return flows. However, due to its size relative to these impacts, fish habitat quality in the mainstem river is now largely unaltered from historic conditions.

Native species present in the river include largescale sucker, mountain whitefish, northern pike minnow, peamouth chub, longnose dace, longnose sucker, cutthroat trout, bull trout, slimy sculpin, and redside shiner.

Largescale suckers, mountain whitefish, and northern pike minnow are abundant throughout the river. The whitefish population is comparable to that found in other large Montana rivers. Longnose suckers occur most commonly below the mouth of Crow Creek and peamouth near the mouth of the Little Bitterroot. Lake trout occasionally spill over Kerr Dam, and brook trout can be found locally in the vicinity of small tributaries like Revais Creek.

The two trout native to the river, cutthroat and bull trout, occur in all segments, but are rare. During four years of intensive study (1983-1986) only 40 cutthroat and 17 bull trout were captured and tagged. Densities were too low for biologists to make reliable population estimates, and it is believed that the few individuals in the river probably originated in the upper reaches of Lower Flathead River tributaries, the Clark Fork River, or Flathead Lake.

Introduced salmonids include both brown and rainbow trout. Browns are the most abundant trout species in the river, and in the 1980s, their densities were highest in Segment One. Population estimates for a portion of this segment averaged 16 fish/km. Rainbows ranked second in abundance and their greatest population density was in the braided part of the river (Segment Four) where the best habitat is located. The population in that segment was estimated to be somewhere between 6 to 11 fish/km. Analysis indicates that there is limited suitable habitat anywhere in the river for the juvenile, fry, and spawning life stages of rainbow trout. Young mountain whitefish may compete with young rainbows for food and larger whitefish may prey upon trout fry. It was believed both of these factors were working to further suppress the rainbow trout population in the river.

The age class distributions of the river and tributaries indicated river recruitment of all trout species is seriously limited and therefore must be supported by tributary spawning. In the 1980s, virtually no adult trout spawning occurred in the main river.

Prior to 1997, recruitment of young trout was further frustrated by fluctuations in discharge, which regularly dewatered a zone on both sides of the wetted river channel. Young trout normally depend on this zone both for food and as a microhabitat, but daily dewatering rendered it barren of aquatic insect life. These impacts were addressed in 1997 when the operations at Kerr Dam were changed to baseload practices. Prior

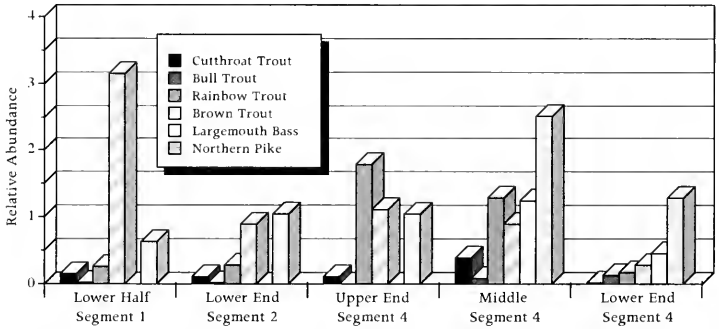


Figure 3.19 The relative abundance of selected species in different river segments as reported in 1988.

Table 3.1. Flathead River, May 1998 electrofishing summary. Fish lengths in millimeters.

Species/Lengths	*Mean*	*Median*	*SE*	*SD*	*Range*	*Min*	*Max*	*Count*	*Percentage*
Bull Trout	374	na	na	na	na	na	na	1	0.5%
Westslope Cutthroat	326	309	26.1	63.8	171	272	443	6	2.8%
Rainbow-Cut Hybrid	345	na	na	na	na	na	na	1	0.5%
Rainbow Trout	345	356	17.5	85.7	281	187	468	24	11.3%
Brown Trout	404	416	9.9	88.6	385	185	570	80	38.0%
Mountain Whitefish	142	130	7.5	32.6	145	120	265	19	8.9%
Northern Pike	566	525	24.9	119.3	429	356	785	23	10.8%
Yellow Perch	152	152	71.0	100.4	142	81	223	2	0.9%
Northern Squaw	337	355	24.8	82.4	320	105	425	11	5.2%
Longnose Sucker	484	485	5.6	31.2	125	425	550	31	14.6%
Peamouth	333	333	27.5	38.9	55	305	360	2	0.9%
Largemouth Bass	409	409	84.0	118.8	168	325	493	2	0.9%
Smallmouth Bass	252	284	23.5	62.2	169	140	309	7	3.3%
Pumpkinseed	144	144	10.0	14.1	20	134	154	2	0.9%

Table 3.2. Flathead River, October 1998 electrofishing summary. Fish lengths in millimeters.

Species/Lengths	*Mean*	*Median*	*SE*	*SD*	*Range*	*Min*	*Max*	*Count*	*Percentage*
Bull Trout	484	484	34.5	48.8	69	449	518	2	0.2%
Westslope Cutthroat	310	301	20.4	45.6	105	265	370	5	0.4%
Rainbow-Cut Hybrid	405	414	19.9	52.5	138	349	487	7	0.6%
Rainbow Trout	358	378	17.6	82.7	237	228	465	22	1.7%
Brown Trout	372	381	11.5	96.3	351	210	561	70	5.5%
Mountain Whitefish	284	300	2.1	68.7	460	0	460	1059	83.8%
Northern Pike	587	605	14.8	129.3	558	279	837	76	6.0%
Perch	192	186	17.4	55.2	172	113	285	10	0.8%
Largemouth	173	163	13.0	34.5	97	142	239	7	0.6%
Smallmouth	252	220	34.4	76.8	184	175	359	5	0.4%

to the change, river fluctuations impacted trout spawning behavior, egg survival, overwintering survival, and overall aquatic insect abundance and diversity. An evaluation of Lower Flathead River habitat suggested that there was little in-stream cover and few feeding and resting stations for adult trout of all species. These habitat factors have always existed, however.

Irrigation practices have created significant problems for trout. Return flows dump substantial amounts of silt and unknown quantities of agricultural chemicals into the river. Irrigation diversions, canals and dams have reduced gravel recruitment and diminished spawning habitat.

The results of 1998 spring and fall electrofishing surveys on the Lower Flathead River are summarized in Tables 3.1 and 3.2.

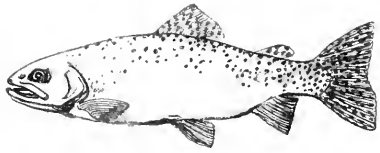
Fishing pressure on trout is low in the river, although it increases every year. The low pressure is due, in large part, to low fish densities; the Lower Flathead River is not considered a good trout fishery. Current regulations require the release of all trout, except lake and brook trout.

Largemouth bass were introduced into the upper Flathead drainage in the early part of this century; fingerlings were found in backwater areas near the mouth of the Flathead River between 1921 and 1928. Both largemouth and smallmouth bass are now found in all permanent backwaters and sloughs of the river. Densities are highest in the larger sloughs. The population of Sinkhole Slough is estimated to be about 14 fish per acre. Bass use the main channel areas of the river infrequently.

Spawning, which takes place in backwater areas (bass prefer riparian or aquatic vegetation for spawning), occurs roughly between May 15 and July 1. Growth rates are good and higher than those reported for other Montana populations. A length frequency distribution calculated in the 1980s suggested the Lower Flathead population was well balanced. However, populations of largemouth bass are not high enough in most backwater areas to support heavy fishing pressure.

Northern pike, introduced into the Flathead drainage in the 1950s, are now found throughout the entire length of the river. The fewest numbers reside in Segment One which provides the least suitable habitat. Numbers increase in Segments Two and Three where pike use the deeper, slower moving waters of river bends, the shoreline eddies and slackwater areas. Segment Four supports the highest concentrations of pike and has the most favorable habitat (with numerous permanent backwaters and sloughs, abundant aquatic vegetation, slower velocities, and a more gradual gradient). Pike are twice as abundant there as in Segments One, Two, or Three. This reach of river also contains the most important area of spawning habitat. Pike move many miles, from both upstream and downstream areas, to spawn there. The numbers decline again in the lower reach of

Westslope Cutthroat



Cutthroat trout (*Oncorhynchus clarki*), which range from Alaska to southern California and from the Pacific Coast to the intermountain area, are of course native to the Lower Flathead River. The particular subspecies in the river is the westslope cutthroat.

Cutthroat trout spawn in the spring when water temperatures reach about 50°F. Eggs hatch anywhere from one to two months after being laid; the exact timing depends, again, on water temperatures. The hatchlings, called alevins, remain buried in their spawning gravels for up to two weeks. Once they emerge from the gravels, the fry seek the slower reaches of streams where they suffer high rates of mortality. Five thousand eggs may yield only two to four spawning adults. Most cutthroat feed principally on insects and other invertebrates.

Habitat loss has decimated freshwater populations of westslope cutthroat trout.

Segment Four, where pike abundance is similar to that of the upper half of the river.

The peak spawning time for northern pike in the river is from late May to mid-June. Females lay their eggs in shallow areas of backwaters and sloughs over the remains of the previous years' aquatic vegetation. In the past, the ability of these areas to provide pike spawning habitat has been diminished by the operations of Kerr Dam. Fluctuating water levels created reverse flows at spawning site entrances and inhibited pike movement. Fluctuating discharges also dewatered spawning marshes and sloughs and desiccated eggs and fry.

Creel survey data collected from river fishermen in the 1980s indicated that at that time northern pike were the most important game fish in the river. Exploitation rates were low, however, when compared with other northern pike fisheries.

Other nonnative species found in backwaters and sloughs include black bullhead, pumpkinseed, and yellow perch.

Past Studies

The most recent and most comprehensive Lower Flathead River fishery investigation took place between 1982 and 1987. This study, which was funded by the BPA, had three objectives: (1) to assess habitat in the river and its tributaries and the relationship of habitat to the size, distribution and maintenance of trout, pike, and bass; (2) to determine how hydropower development affects aquatic habitat and the life stages of trout, pike, and bass; and (3) to develop management options to mitigate impacts. Other recent fisheries-related work includes a 1983 BPA-funded creel survey conducted by fisheries biologists.

In 1979 the FWS conducted a general fisheries inventory designed to help assess the impacts of proposed hydropower projects. The survey included a broad analysis of fish habitat and general work on the relative abundance of various fish species. The FWS also conducted periodic spot checks on the river. Other than these limited inventories, little fisheries work by the FWS has been done on the Lower Flathead River.

There have been at least two aquatic insect surveys of the river. A 1986 study by staff of the Yellow Bay Biological Station examined the impacts of Kerr Dam on zoobenthic communities and the implications for fisheries management. An earlier study by the FWS was conducted in fall of 1980. Its also attempted to determine the effects of rapid river flow fluctuations on aquatic insect distribution and diversity.

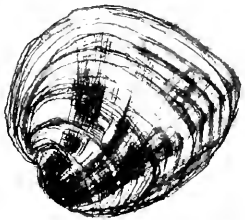
The Tribes Settle Their Mitigation Claims Early in 2001

The final settlement of the Confederated Salish and Kootenai Tribes' mitigation claims related to the construction and operation of Kerr Dam was completed early in 2001. This settlement includes provisions for the acquisition of 985 acres of wetland and riparian habitat to replace varial zone habitat lost due to the operations of Kerr Dam on the Lower Flathead River. It also includes provisions for acquisition of 312 acres of riparian habitat. Habitats acquired will be restored to provide the optimal wildlife habitat and wildlife productivity. In addition, opportunities for restoration at other sites on the reservation will be pursued. Wildlife monitoring will center on representative habitat.

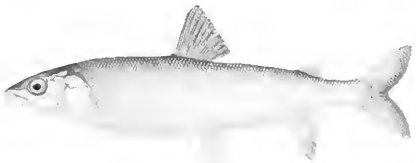
This Invertebrate Begins Life on a Fish

Mussels mate when the male sheds sperm into the water and the female draws that sperm in with her inhalant current. The fertilized eggs incubate and hatch in the female's gills. Eventually, the larvae, or glochidia, which resemble miniature adults, leave the female and disperse in huge numbers, often on a web of mucous. Fish feed heavily on glochidia. Some of the larvae survive, however, and attach themselves to the gills and fins of fish where they form cysts and live as parasites. After about twenty days, when the larvae are about one one hundredth of an inch in size, the cysts rupture, and the mussels drop free and attach themselves to the river bottom. They reach full size two years later.

Fish provide mussel larvae with nourishment, protection against bacterial and protozoan attack, and a means of dispersal (glochidia can't swim on their own). If a larva fails to attach to a fish, as most do, they fall to the bottom where they are eaten by fish or insects or smothered by sediment. Among the river's fish species that serve as mussel hosts are trout, suckers, pike, bullhead, bass, perch, pumpkinseed, and sculpin.



Common Fish of the Lower Flathead River

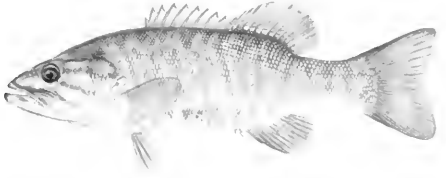


X̌ʷy̓u [Salish] **(Mountain Whitefish)**
Prosopium williamsoni
The mountain whitefish is a native species and an active feeder that eats mostly aquatic insects, but the species also consumes terrestrial insects that fall into the water. It feeds in riffles throughout the winter. Age-length statistics are as follows: 1st year—4 inches; 2nd year—8 inches; 3rd year—11 inches; 4th year—13 inches; 5th year—14 inches; 6th year—16 inches.

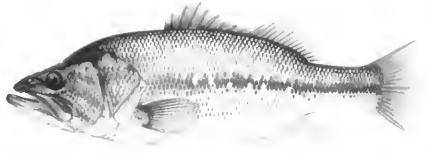
Pisɬ [Salish] **Westslope Cutthroat Trout**
Oncorhynchus clarki
The westslope cutthroat trout is one of several subspecies of cutthroat trout native to the Rocky Mountain region. It often exhibits bright yellow, orange, and red colors and is generally distinguishable from other inland subspecies of cutthroat trout by the particular pattern of black spots that appear on the body.
The species feeds primarily on immature and mature forms of aquatic insects, and terrestrial insects. It rarely feeds on other fishes. Average age-length statistics are as follows: 1st year—3 inches; 2nd year—6 inches; 3rd year—8 inches; 4th year—10 inches; 5th year—12 inches. The species is declining throughout much of its range.

Aáy or ɬaʔáy/ Tuhuɬ **(Bull Trout)**
Salvelinus confluentus
The bull trout received its name from its large head and mouth. It is also distinguished by its predatory nature, and its diet as an adult consists largely of other fish. But when given an opportunity it has also been known to eat frogs, snakes, mice, and ducklings. Bull trout can live up to ten years and are sexually mature after four. Average age-length statistics are as follows: 1st year—3 inches; 2nd year—5.5 inches; 3rd year—8 inches; 4th year—11 inches; 5th year—14 inches; 8th year—20 inches. Can reach over 35 inches. The species is declining throughout much of its range.

Brown Trout
Salmo trutta
Introduced from Europe in 1883, the brown trout is now widely established in western United States. It is more difficult to catch than rainbow and cutthroat trout and has a reputation for being able to resist environmental changes. The coloration is normally yellowish-olive dorsally, with black and occasional orange-red, blue-bordered round spots on the sides. Food is primarily insects, other invertebrates, and smaller fishes.

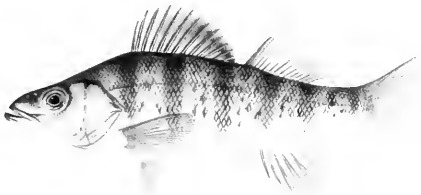


Smallmouth Bass
Micropterus dolomieui
This nonnative is distinguished by its bronze back, red eyes, defined dark bars that radiate the eye area, and tiny flecks of gold on some scales. It is a cool water species that prefers streams with gradients sufficient to produce riffle areas and clean bottoms. Smallmouth take about 4 years to become sexually mature. The average weight is from 1 to 3 lbs.

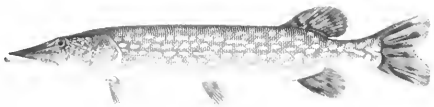


Largemouth Bass
Micropterus salmoides
The largemouth is not native to western Montana. It prefers somewhat turbid, weedy, quiet waters. It may be distinguished from the closely related smallmouth by its larger size, the dark lateral stripe, and the fact that the posterior end of the upper jaw extends to beyond the eye in adults. The largemouth reaches a record weight of 22 pounds 4 ounces and feeds mainly on other fishes.

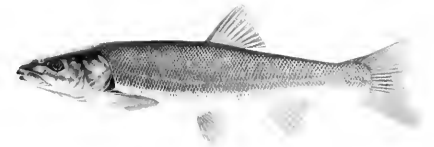
Common Fish of the Lower Flathead River (cont.)



Yellow Perch
Perca flavescens
Yellow perch have an almost circumpolar distribution in the fresh waters of the northern hemisphere. They are generally 4-10 inches long. Coloring varies with size and habitat but usually the back and head are a bright green to olive or golden brown; sides are a yellow-green to yellow with the color of the back extending down in tapering bars. Spawning occurs in the spring in the shallows of lakes and tributary rivers. They are not native to the river.



Northern Pike
Esox lucius
Not native to the river. The basic coloring of this fish is light spots on a darker backing, the back being a brilliant green through olive-green to almost brown. The eyes are a brilliant yellow. The northern pike is a spring spawner which scatters its eggs at random throughout the heavily vegetated floodplains of rivers, marshes and lakes. The eggs hatch 12-14 days later. Life expectancy ranges from 10-26 years according to the area. Adults feed largely on other fish as well as frogs, crayfish, mice, muskrats, and ducklings.



Q̓ʷq̓ʷé [Salish] (Northern Pikeminnow)
Ptychocheilus oregonensis
The northern pikeminnow, a native of the Columbia River system, is a large member of the minnow family. It has a long snout and large mouth and is similar in shape to the walleye. It eats other fish and invertebrates. There is concern elsewhere in the Columbia Basin that northern pikeminnow are hurting salmon recovery.

Chapter 4

OF SPOTTED KNAPWEED, SMALLMOUTH BASS, AND NORTHERN PIKE: CHANGES WE'VE BROUGHT TO THE RIVER

Kerr Dam has changed the plant life along the river in three major ways: first, the riparian zone — that ribbon of green water-loving plants right next to the river — has shrunk by as much as 6,700 acres due to a dewatering of the floodplain; second, riparian areas have become less diverse and have changed from communities dominated by cottonwood and willow to stands of ponderosa pine and Rocky Mountain juniper; and third, large amounts of riparian acreage have been converted to crop land.

Overgrazing, too, has impacted the riparian zone by changing shrub communities to grasses and herbs, by promoting and spreading noxious weeds, by reducing or eliminating plant cover, and by destabilizing streambanks.

In recent years, leafy spurge has become established on the banks of some islands. Leafy spurge is extremely hard to control and is spreading rapidly through riparian areas. Other noxious weeds are out of control too, among them spotted knapweed, sulfur cinquefoil, and thistles.

Big Floods Brought Diversity

By comparing pre-dam aerial photographs of the river corridor with present-day photos, biologists have documented some of the changes brought about by Kerr Dam.

Several islands on the Lower Flathead River were devoid of vegetation before the dam was built. This was probably due to the floods that historically occurred about once a decade. Pre-dam flows on the river that exceeded or equaled 75,000 cubic feet per second (cfs) and that lasted for at least a week occurred 4 times in the thirty years between 1907 and 1937. Compare that with the flows that occurred since 1990 shown in figure 4.1. These flows are typical of those that have occurred since dam construction. Without the big floods, most of the islands have become overgrown with grass and shrubs. Since the dam, islands have also been altered by the large blocks of ice carried across their surfaces by the river during extremely cold winters. The ice periodically sheared off juniper and shrub cover and caused erosion on the islands and along the banks of the main channel. Pre-dam conditions may have included ice-caused erosion, but river flows were generally low (>3,000 cfs) so the damage would have been minimal compared to what happened in the decades after the dam was built when the flows were usually around 8,000 to 10,000 cfs.

Another area of impact was the gravel bar/shoreline area between low and medium water levels, an area known as the varial zone. Because of its proximity to water, this zone is important to geese year round, both for loafing and feeding. Although in some locations, this area is sparsely vegetated, much of this zone is devoid of vegetation. When Kerr was operated as a peaking facility, the varial zone was denuded by constantly fluctutating water levels. If flows had been kept higher, they would have encouraged submerged aquatic and emergent marsh species to grow. If kept lower, they would have allowed more terrestrial grassess, forbs, and sedges to become established. But under the peaking regime, only species tolerant of daily or even hourly shifts between being submerged and dry were able to survive.

Since 1997, Kerr has been operated as a base-load facility. But even under this new regime, impacts to the varial zone are expected to continue. The current annual hydrograph for the Lower Flathead River shows a reduction in peak flows and an increase in winter flows from the pre-impoundment hydrograph. These changes in flows cause the normally vegetated varial zone to become abnormally inundated. The longer period of flooding does not allow riparian vegetation to exist where it normally would. This is especially true in the lower half of the river's course. The area between the high and low water levels of these two reaches has become a largely unvegetated zone dominated by mud and rock. In addition, other habitat impacts associated with Kerr Dam include: a shift in the deciduous and mixed deciduous/coniferous vegetative communities toward a conifer-dominated community; dewatering of the floodplain, which has accelerated the conversion of riparian areas to agricultural lands and livestock grazing; a reduction in the recruitment of early successional riparian species such as cottonwood and sandbar willow; and wetland losses (2,352 acres) within the zone of fluctuating water levels. These impacts are discussed in more detail in the paragraphs that follow.

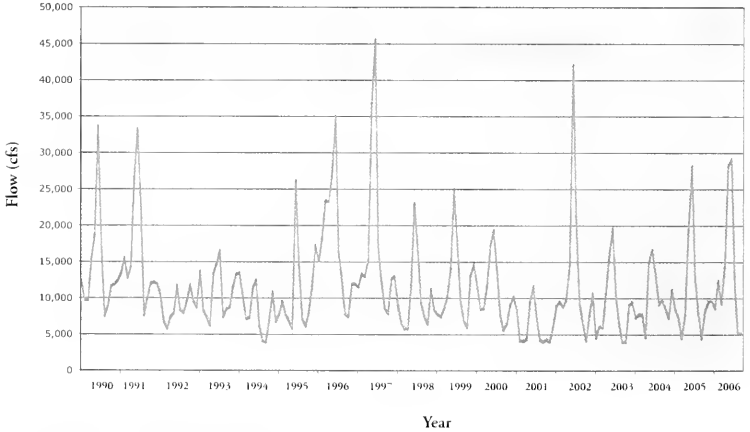


Figure 4.1. River flows that have occurred since 1990.

Impacts on Deciduous Communities

Flooding the river banks for extended periods of time during June and July (which is unnatural) has inhibited the germination and growth of young cottonwood trees. In addition, the lack of extreme floods has reduced the amount of "pioneering" habitat available for the seedlings of primary successional species like cottonwood. The result is that for more than half a century now, there has been very little regeneration of black cottonwood along the river. Grazing has also had an impact. Cattle readily graze young cottonwood trees, and beaver use them in their structures and for food. Both have an impact on regeneration, although much more local than the effects of the dam.

Most of the black cottonwood forests on the lower river are 60 to 110 years old. The few island and backwater areas which supported cottonwood stands less than 30 years old are probably insufficient to sustain the natural abundance of cottonwoods along the river. As the older cottonwoods degenerate and die over the next 100 years (cottonwood is a short-lived species), they will be replaced by conifers and numerous wildlife species dependent on them will be affected.

In short, the control of water levels imposed on the river by Kerr Dam has reduced the diversity of habitats along the river. If periodic (once a decade) simulations of water levels during extreme wet and dry years could be incorporated into the management and operations of Kerr Dam, this problem could be at least partially alleviated.

Changes in River Cover Types

In 1990, the Montana Riparian Association examined aerial photos of the river to determine changes in the riparian zone resulting from the construction of Kerr Dam. The pre-dam photos they looked at were from 1934, 1935, 1937, and 1944. Post-dam photos were taken in 1981.

Figure 4.2a shows the acres of the individual riparian cover types for both the pre-dam and post-dam aerial photography.

Before the dam, the cover types covering the most area were the herbaceous type, which occupied 31.4% of the total riparian acres; agricultural land, which occupied 17.4%; and barren land, which occupied 13.7%. Together, these three types covered 62.5% of the total riparian acres. In the air photos taken some four decades after the dam was constructed, these three categories still covered the most area. However, in two of the categories, the percentages had changed significantly. The herbaceous type dropped from 31.4 to 20.9%, while agricultural land increased from 17.4 to 34.4%.

Figure 4.2b shows the magnitude of the changes (in terms of percent gain or loss). The greatest change occurred in the agriculutural land category. As of 1981, it saw an increase of 94.8%. The next largest increaser is the closed-canopy coniferous forest, which increased by 87%. The dense shrub category also saw a big increase- 64.2%. Increases also occurred in the open-canopy coniferous forest types.

Among the types that saw big decreases are the deciduous and mixed forest types and the herbaceous and sparse shrub types.

The coniferous forest riparian cover type represents one of the most successionally advanced stages within the riparian zone of the Lower

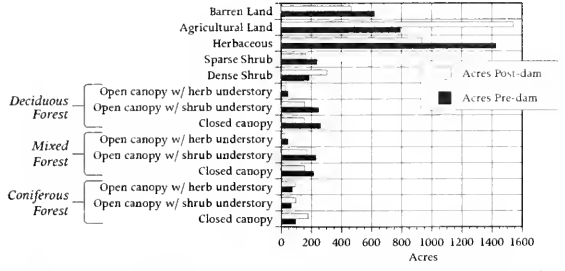


Figure 4.2a. Acres of the individual riparian cover types for both the pre-dam and post-dam aerial photography.

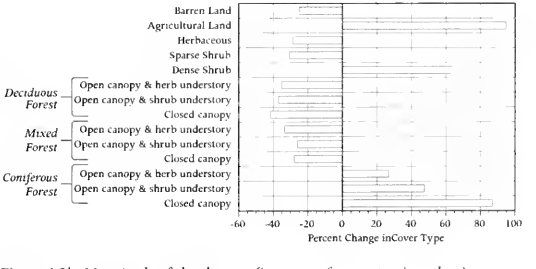


Figure 4.2b. Magnitude of the changes (in terms of percent gain or loss) between pre-dam and post-dam eras.

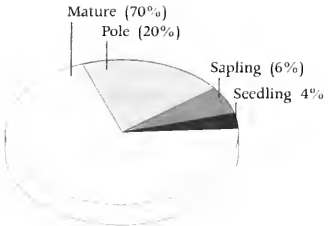


Figure 4.3. Age structure of the cottonwood community.

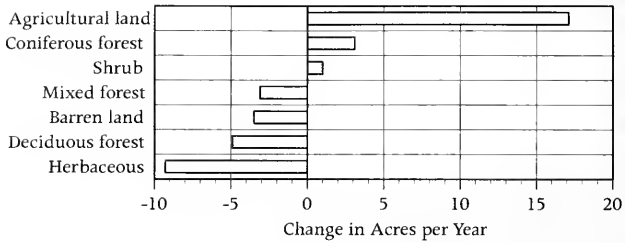


Figure 4.4. Average rate of change in acres per year of vegetation types since 1937.

Flathead River. In addition, the coniferous forest category occurs on some of the driest sites within the riparian zone. Kerr Dam operations changed the river's dynamic equilibrium within the riparian zone in favor of the drier types. This resulted from the overall dewatering of the aquifer within the Lower Flathead River floodplain. This dewatering accelerated the conversion of riparian communities to agricultural land.

Black cottonwoods are shade intolerant, that is they do not reproduce in their own shade. Therefore, in order to replace a stand of mature cottonwoods, the recruitment of new sites with favorable moisture conditions for cottonwood establishment is essential. If these requirements are not met, a reduction in the extent of the cottonwood community will occur.

Figure 4.3 shows the condition of the cottonwood community as of 1990. The approximate age classes for each stage are: seedlings—1 to 5 years, saplings—5 to 15 years, pole—15 to 35 years, and mature 35 to 75 years. The oldest cottonwood observed on the river was about 80 years old.

In order for the cottonwood communities to maintain their populations, the proportion represented by the seedling, sapling, and pole stages should equal that represented by the mature stage. A number below this indicates cottonwood are not maintaining their population.

It is obvious then from the pie chart that if conditions do not change, a dramatic reduction in the acres of cottonwood forests along the Lower Flathead River will occur. Even if favorable sites and conditions for cottonwood recruitment became available today, there would still be a greatly reduced age class covering the time span from the present to the time when Kerr Dam was built. The situation with cottonwoods along the Lower Flathead is common along dammed rivers and has been well documented by researchers.

Contributing to the phenomenon of low cottonwood recruitment is the low survivability of seedlings (only 1 to 5% survive). In general sites with seedlings are ephemeral in nature. They may be present one year and gone the next due to the dynamic nature of the river. Therefore only a small percentage of the seedling sites at any one time will survive to develop into the sapling stage. The survivability of saplings is much higher (75 to 90%).

Figure 4.4 shows the average rate of change in acres per year since 1937.

Changes in the Fishery

Smallmouth bass (*Micropterus dolomieu*) were introduced into reservation waters in about 1986 in Lower Crow Reservoir. Individuals of this population moved downstream and rapidly colonized the waters of the Flathead River. Because of the rapid growth of the smallmouth population in the Flathead River, the tribal fisheries program studied the population from 1998 to 2005 and published their findings in an appendix to a report in 2006. In brief, this study concluded that smallmouth bass rapidly increased their population size during the study period, particularly from 2001 to 2005. The study noted that smallmouth bass prey on fish during certain periods of the year, but that their diet varies considerably from season to season. Because the tribes are interested in managing for native trout species in all reservation waters, predation by smallmouth bass on these species is of particular concern. The study cautiously concluded that predation by smallmouth bass on native fish species was moderate, but that additional study was warranted to determine the effect his introduced nonnative fish might have on the native trout species of the river.

A Summary of the Impacts on Vegetation

Kerr Dam has affected the river in two significant ways. The first is the way any dam impacts a river. These impacts continue on the Lower Flathead, even with the change in dam operations. All undammed rivers are naturally dynamic. They overflow their streambanks every couple years thereby dramatically increasing the rate and amount of aquifer recharge. In addition, it is also natural for the river to move back and forth across its floodplain. Therefore, a dynamic river system is natural; a static system is unnatural. The reduction of high flows and the elimination of overbank flows has greatly reduced aquifer recharge, soil moisture, soil nutrient enrichment, and the recruitment of new seedbeds. This has severely affected the natural equilibrium of riparian species. Generally, there has been a tremendous reduction in the recruitment of pioneer species like black cottonwood and sandbar willow, and an acceleration to the drier climax species of ponderosa pine and Rocky Mountain juniper. In addition, the dewatering of the floodplain has resulted in a large conversion of the riparian vegetation to agricultural land. Dewatering combined with overgrazing has converted many of the wetter shrub types into herbaceous vegetation. Without the normal high flows or floods, the amount of erosion on the outer part of a river bend and subsequent sediment deposition on an inner part of the bend or in other backwater areas (new sites for pioneer species) are reduced accordingly. In fact, the high flows/floods may be so severely restricted that no new sites for the establishment of pioneer species can occur.

The second impact Kerr Dam had on the river was caused by the way the dam was operated for more than 60 years. Historically, Kerr was operated as a load control or "peaking" facility by the Montana Power Company. Peaking operations affected the river in four important ways, which are listed below. It should be pointed out that under the new license agreement, the dam will be operated as baseload facility and some of these impacts will be addressed.

1. Flow reversal frequencies (e.g., the varying of the rate of change of the discharge from increasing levels to decreasing levels and back).

The number of flow reversals for the month of June increased from the pre-dam (time period of 1908 to 1937) average of 55 to a post-dam (time period of 1962 to 1987) average of 145. For the month of July, the flow reversals increased from a pre-dam average of 36 to a post-dam average of 180.

Early June through late July is the time that black cottonwood and sandbar willow disperse their seeds. Flow reversals by Kerr Dam affected the sites where these two species tend to establish themselves—point bars, mid-channel bars, side bars, and delta bars. Repeated water-level fluctuations of as much as 1.5 meters at a time over a 24-hour period effectively prevented new seedlings from becoming established.

2. Lowering of peak daily discharges.

The dam spread flows more uniformly throughout the year. This resulted in the lowering of the median daily discharge from 50,700 cfs during the pre-dam period to 38,600 cfs during the post-dam period. In addition, the maximum and minimum daily flows decreased from 82,100 to 64,300 cfs and from 21,000 to 12,800 cfs, respectively. Lower median discharges results in reduced streambank recharge. In addition, lower maximum discharges severely impacts the natural geomorphic actions of the river (e.g. over-bank flooding, meander migration, etc.). It is natural for a river to overflow its banks every couple of years and it is natural for a river to move back and forth across its floodplain. A moving river system is natural, a static system is unnatural.

3. Higher winter flows.

The median winter flows (November-March) increased from a pre-dam flow rate of 3,120 cfs to a post-dam flow rate of 10,500 cfs. During the potential icing period (December to February), the change went from 3,120 to 11,300 cfs. Ice flows over 1 meter in depth

can form during these high water flows and can impact more area then they did before Kerr Dam was built. The ice affected more of the streambank and subsequent riparian vegetation than it did before the dam.

4. Sediment loss.

The Lower Flathead River was probably never rich in sediment because Flathead Lake has always acted as a sediment trap. However, there is reason to believe that Kerr Dam further decreased the sediment load of the river. During spring runoff, the Upper Flathead River (the part of the river upstream from Flatbead Lake), loaded with suspended sediments, enters the lake. (An annual average of approximately 150,000 tons of suspended sediment is discharged into Flathead Lake by the Flathead River during the month-long runoff.) As the river enters the lake, the water slows down and begins to drop its load. However, because the river is usually warmer and less dense than the lake, its waters tend to not mix with those of the lake; small silt and clay particles tend to stay suspended forming a spring turbidity plume. Before Kerr Dam was built, much of this turbidity plume moved all the way through the lake and into the Lower Flathead River. But now the dam traps much of that sediment.

The water released by the dam in now considered "hungry" water because it tries to reestablish an equilibrium by picking up sediments from the banks and bed of the Lower Flathead River. This has had a dramatic impact on the development of new sites suitable for the establishment of cottonwood and willow seedlings.

The end result has been a reduction of the riparian zone and a fundamental shift away from the pioneer species (cottonwood and willow) to later successional stages (ponderosa pine and Rocky Mountain juniper). In addition, because of dewatering of the aquifer caused by the operations of Kerr Dam, large tracts of the riparian zone and wetlands have been converted to agricultural land. It is likely that because of Kerr Dam, a drastic reduction in the acres of cottonwood gallery forests along the Lower Flathead River is inevitable. Reducing or eliminating the threat of large floods has also allowed homes to be built in what was the historic floodplain, causing further reductions in habitat.

Water Quality

The quality of water leaving Flathead Lake is very good, as is that of the Lower Flathead River throughout Segment One. In river Segment Two, however, the sediment load carried by the river increases after White Earth Creek, the Little Bitterroot River, and at least three major irrigation return flows laden with sediment empty into it. The Little Bitterroot River has among the highest sediment levels as well as elevated soluble phosphorous concentrations. From Kerr Dam to Sloan Bridge, river water temperatures increase by 1 to 2° C.

The quality of river water continues to decline in river Segment Three as additional irrigation return flows and Crow and Mission Creeks join the river. Like White Earth Creek and the Little Bitterroot, these return flows and tributaries carry elevated concentrations of suspended solids. They also transport high levels of nutrients and bacteria picked up from irrigated fields, livestock feedlots, urban storm runoff, and municipal waste-water lagoons. Both Crow and Mission Creeks show elevated levels of soluble phosphorous and have among the highest soluble nitrogen concentrations of major tributaries in Clark Fork River basin. These streams and return flows may also carry higher than acceptable levels of agricultural chemicals. Crow Creek, Mission Creek, and the Jocko River decrease river water temperatures; from Sloan Bridge to Dixon the river temperature drops about 2 C.

The tribal post and pole yard that was located at the Old Agency used a diesel/pentachlorophenol mixture to treat poles. The site is located adjacent to the river. The abandoned Old Agency dump is located next to the pole yard. Both are potential sources of contamination although an environmental study did not reveal any contamination.

Only limited amounts of additional sediment and nutrient pollution enter the river below Dixon. Much of the fine silts and clays picked up in upper river segments remain suspended, however, and give the river an unusual greenish or aquamarine color.

There is a 2 C rise in river water temperature between Dixon and Perma.

Past Studies

The U. S. Geological Survey (USGS) maintains two monitoring sites on the Lower Flathead River. One is located at Kerr Dam and continuously records discharge. The other is located at Perma. In addition to discharge and temperature, the USGS recorded basic chemical parameters at Perma until the summer of 1992.

Nonpoint Source Assessment

Confederated Salish and Kootenai Tribes Ordinance 89B defines a nonpoint source, in part, as "any activity of man which contributes or may contribute pollutants to reservation waters by drainage, diffuse flow, erosion, diversion, or pumping and which is not a point source." These activities may include agriculture, forestry, mining, construction, and disposal of pollutants, among others. In addition, habitat alteration and hydrologic modification (including placement of dams) are considered nonpoint sources of pollution. As part of the tribal Water Quality Program's efforts, the tribes conducted a nonpoint source assessment of water quality conditions on the reservation in 1999. The report included potential causes of pollutants and how these might affect uses of reservation waters, including the Flathead River.

Agriculture and Range

Parts of the river corridor have been used by several generations of Montanans for ranching and farming. The area has provided these families with an income and a valued way of life.

There are under two thousand acres of cropland within the river corridor. These lands are used primarily as pasture and for grain and alfalfa fields. Virtually all of this acreage is located between river-mile 20 and river-mile 42. Much of it is concentrated around Dixon. A substantial portion of the acreage has been converted from riparian habitats. The result has been a significant loss in wildlife habitat, a degradation of water quality and negative impacts on the fishery. A joint project between the tribes and the Montana Department of Transportation created/restored a significant wetland area just west of Hoskins Landing in Dixon in 2001.

Irrigation return flows from agricultural lands within and outside of the corridor have substantially increased the volume of sediment entering the river. The Little Bitterroot River, White Earth Creek, Coleman Coulee, and several other smaller drainages in the vicinity of river mile 60, river mile 57, and river mile 45 are major contributors to stream turbidity and streambed sedimentation. In addition, return flows likely contribute significant quantities of nutrients to the Lower Flathead River, although the full extent of this problem has not been documented. The extent of pesticide pollution of the river is also unknown, however, it is suspected that irrigation return flows are a potential source of these contaminants.

Most of the cattle grazing within the corridor occurs in Segments Two and Three. The west side of Segment Two of the river is part of a single range unit that is used as summer and fall pasture (May to October). Portions of the east side of Segment Two are broken into individual leases which the lease holder has the option of using as summer, fall, or winter pasture. The west side of river Segment Three is part of two range units used summer and fall. Rangelands on the east side of Segment Three are used principally in the fall.

Cattle do not distribute themselves evenly over the range. Riparian areas and uplands close to water receive the most concentrated use; many have been heavily impacted by livestock over the years. The levels of use have often exceeded the capacity of native bunchgrasses to survive and reproduce. Riparian areas that were once dominated by shrubs have been converted to herbaceous communities, infestations of noxious weeds and undesirable species have increased dramatically in recent years, streambank vegetation has been reduced or eliminated, and bank erosion has accelerated. The timing of use is also a problem; in some areas cattle are turned out on the range too early in the spring. While there is a need for a up-to-date assessment of range conditions, indications are that the current conditions of riparian areas and uplands located near the river are at best fair to poor and deteriorating.

Past Studies

Cropland acreages within the corridor have been mapped as a part of two wildlife studies. A BPA funded study of Canada Geese conducted in the mid-1980s identified major vegetative covertypes within much of the corridor. The 1990 furbearer study by the BIA and the Montana Riparian Association also documented cropland acreages within the corridor. Their analysis included an estimation of the rate of cropland increase within the corridor.

Recreational Use

Two categories of recreational use occur on the river: commercial and non-commercial. The only legal commercial operation is the Flathead Raft Company which leads two whitewater trips a day, seven days a week from Kerr Dam to Buffalo Bridge. Their season generally runs from the first week of June to the first week of September. In 1990, they transported about thirty-nine hundred visitors down this segment of the river. There is evidence that a small amount of illegal commercial use is occurring, especially on the more remote sections of the river.

In 1990 non-commercial or public use of the river was estimated to be approximately 14,193 visitor days for the thirteen-week period running from the first week in July to the second week in October. Winter use is estimated to be only about three to five percent of that occurring in summer. There is a significant amount of non-floating visitor use that occurs just below Kerr

Dam (associated with the Kerr Overlook and the river shore immediately below the dam) which has not been documented. Hence, total commercial and non-commercial use is estimated to be between nineteen and twenty thousand visitors days per year.

According to 1990 visitor registration data, which included tribal as well as non-tribal members, Segment One, which received about half of the total use, is the most popular stretch of river among recreationists. It is followed by Segments Two (27%) and Four (19.4%).

The river corridor is traversed by many roads and is accessible at dozens of points; for example, Segments One and Two alone contain over sixty roads that provide access to the river. The access point receiving the most use is Buffalo Bridge. This is because boaters using both Segments One and Two use the site to either take-out or put-in. According to visitor registration data, the second most popular access point is the old Dixon Bridge site, then Kerr Dam, and then Sloan Bridge. However, informal observations suggest that registration compliance may have been low at the Kerr site, and that Kerr Dam probably receives more use than the old Dixon Bridge site.

There are dozens of impromptu campsites scattered throughout the corridor. The largest of these are at Goose Bend (river mile 62) and the Moiese-Foust Slough area (river mile 30). Three official campsites or picnic areas have been modestly developed with tables, outhouses, or both. These are located at Buffalo Bridge, Sloan Bridge, and the old Dixon Bridge site. The most popular campsites on the river are at the Buffalo Bridge, Moiese/Foust Slough, and Goose Bend areas. There are four frequently visited cultural or historical sites.

There are approximately seven easily accessible boat ramps within the corridor. These are located in the vicinity of Kerr Dam, Buffalo Bridge, Sloan Bridge, Dixon, and the Perma Bridge. They are used by canoeists, rafters, and motorboaters. During the peak floating times, lines often form at the Kerr Dam and Buffalo Bridge launch sites.

The 1990 survey of river users found that canoes and rafts make up 70% of the boats on the river, while motorboats account for about 11%. The majority of persons using motorboats are anglers and waterfowl hunters. Tribal regulations restrict motorboat use to fifteen horsepower or under and the river is closed to nonmember motorboat use from March 1 to June 30.

The survey also found that the most popular activities of recreationists are floating, photography and nature study, swimming, fishing, picnicking, and camping, in that order. The average size of a group is between 4.6 and 5.4 persons. The most common group size is two. However, over 14% of the use is from groups of eleven people or larger, and groups as large as seventy have been reported. The average length of stay is 1.35 days. Virtually no groups stay longer than four days. Most visit the river during evenings, especially on weekends.

When people visiting the river in 1990 were asked to rank uses that they perceive as conflicting or potentially conflicting with their enjoyment of the river, the use of motorboats was ranked the highest. Changing water flows, logging, and off-road vehicle use also ranked high.

A 1991 survey of non-members who purchased 1990 Flathead Reservation Bird Stamps, found that the river corridor was one of the most popular areas on the reservation for bird hunting. Those who hunted only waterfowl ranked it as the most popular destination, those who hunted both waterfowl and upland gamebirds and those who hunted only upland gamebirds ranked it second (behind Ninepipe). The percentage of each type of hunter that visited the river corridor in 1990 is shown in figure 4.5.

Off-road motorcycle use and other forms of off-road vehicle travel have created numerous impromptu roads and trails, often on steep grades. Most of this use occurs on the east bank of Segments Two and Three, in the vicinity of Buffalo and Sloan bridges. It has resulted in a degradation of the aesthetic quality of the river corridor and has created erosion problems.

Due to the remote nature of much of the river, corridor enforcement of tribal recreation regulations is difficult. Indications are that a number of problems related to law enforcement exist. The most significant of these are: low permit compliance, indiscriminate off-road vehicle use, littering, poaching, teenage parties, and illegal commercial operations. A part-time river ranger would help to alleviate many of these problems.

Visitor use surveys suggest strongly that recreationists are attracted to the river because of its remote, undeveloped character. The surveys indicate that certain development activities, if allowed to occur within the corridor, would negatively impact recreational users. These include hydropower development, housing construction, the logging of sensitive viewsheds or river bottomlands, and the development of commercial businesses.

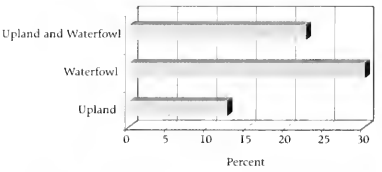


Figure 4.5. The percentage of each of three different types of Flathead Reservation bird hunters visiting the river corridor.

The culture committees have stated that current levels of recreational use conflict at times with traditional tribal member uses of the river. In addition, vandalism of at least one important cultural site located near a popular recreation area has occurred. Indian cultural and spiritual uses, which include hunting, fishing, food and medicinal plant harvesting, and spiritual use, require a high degree of privacy and a pristine natural environment. The Salish-Pend d'Oreille Culture Committee believes that increases in recreational use that are uncontrolled may one day destroy the value of the river as a vital cultural area.

Past Studies

A more recent survey of tribal member river use and their preferences for river management was a 1992 survey of tribal members who live on the reservation. In addition to questions about river management, the survey asked respondents the areas of the river corridor they use and how they use them.

A study of river recreation use was conducted by the CSKT Wildland Recreation Program during 1990 and the spring of 1991. This survey included the collection of: (1) data on visitor use and visitor attitudes from registration boxes located at major access points and (2) observations of use at Buffalo Bridge, Sloan Bridge, the old Dixon Bridge site, and Perma. The study was designed so results would be comparable to a study conducted 13 years earlier by the Wilderness Institute of the University of Montana.

The Wilderness Institute study took place over the summer of 1977. Observations were made on visitor characteristics, recreational activities, numbers of visitors, and the locations and periods of use.

In 1991 the tribal Wildlife Program surveyed non-member bird hunters who had purchased a Reservation Bird Stamp in 1990. That survey asked bird hunters where they hunt waterfowl and upland gamebirds.

In 1980, the tribal Wildland Recreation Program inventoried and mapped most of the campsites and access routes to the river within the corridor.

In addition to information on fishing gathered during the recreation surveys mentioned above, data on angler use of the river includes a 1983 creel survey, tag return data collected since 1983, and a angler survey conducted in the spring of 1991 targeting pike fishermen.

The one commercial operation is required to keep records on the numbers of individuals they serve each day and the activities those individuals are involved in.

Hydropower

River flows are controlled by the operations of Kerr Dam, which was constructed in the 1930s. Prior to 1997, the dam was operated as load-following, peaking facility. Fluctuations were often dramatic; just below the dam, water levels changed as much as two to eight feet in as little as three hours. At Dixon water levels changed as much as six inches in three hours. Flows fluctuated twenty thousand cubic feet per second (cfs) in twenty-four hours. Between 1983 and 1986 flow rates varied from fifteen hundred to over forty-two thousand cfs. Since 1997, the facility has been operated as baseload facility and the hydrograph more closely resembles that of a natural river. However, river flows are still not natural; they are higher during the late summer and winter, and large flood events no longer occur. As a result, the riparian and varial zones are not expected to recover. Figure 4.7 is a hydrograph for water year 1998-1999.

The chart shows that the highest river flows occur between May and August, the lowest during fall and winter months. Fluctuations are greatest from April to September and relatively stable during the rest of the year.

The impacts of the operations of Kerr Dam on fish, wildlife, and vegetation within the corridor have been well documented in a series of reports published in recent years. Many of these are discussed in other sections of this report. Mitigation measures are currently being developed and negotiated.

Past Studies

The impacts of the operations of Kerr Dam on fish, wildlife, and vegetation resources are

Figure 4.6. Kerr dam in its early years.

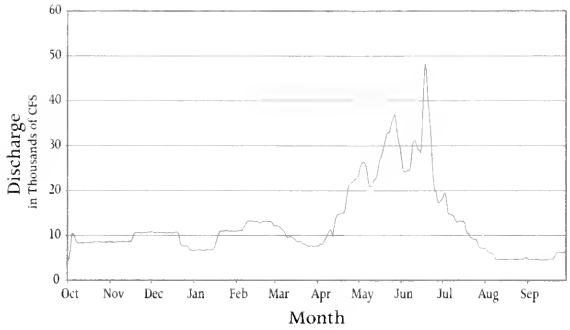


Figure 4.7. Monthly discharge in cubic feet per second for the Lower Flathead River with Kerr operating as a baseload facility.

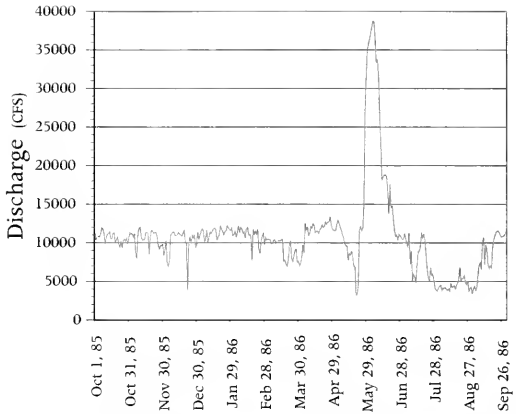


Figure 4.8. Monthly discharge in cubic feet per second for with Kerr operating as a peaking (load-following) facility (1985-86). Daily fluctuations, which do not show up here, were also dramatic.

discussed in several studies listed in the references at the end of this book.

The U.S. Army Corps of Engineers studied dam sites on the Lower Flathead River from 1976 to 1979. Their investigations, though halted prematurely, included a limited analysis of river geology, hydrology, engineering studies, and potential socio-economic impacts of dam construction. During this same period, the FWS conducted a U.S. Army Corps of Engineers (COE) funded investigation to determine the impacts of dam construction on fish and wildlife resources.

The USGS published a report on dam sites on the Lower Flathead in 1965. Earlier studies by the COE (conducted in the 1940s) have also examined hydropower sites on the Lower Flathead.

Figure 4.7. Erin Lindburg photo.

References for Further Study

Confederated Salish and Kootenai Tribes (CSKT). 1992. Draft Management Plan. Lower Flathead River. Confederated Salish and Kootenai Tribes, Pablo, Montana.
This draft plan includes descriptions of resources and uses along the river, although the information is now somewhat dated. The plan also includes tribal management guidelines and objectives for the river corridor.

CSKT. 2000. Forest Management Plan, Flathead Indian Reservation. Forestry Department, Confederated Salish and Kootenai Tribes. Pablo, Montana.
The plan guides tribal management of timbered acres on the reservation. While there is not a lot of forestland within the river corridor, forestland does border the corridor and is visible from the corridor.

CSKT. 2000b. Kerr Project Fish and Wildlife Implementation Strategy. Confederated Salish and Kootenai Tribes. Pablo, Montana
This document sets forth fish, wildlife, recreation, and conservation goals for mitigation of the impacts associated with the Kerr Hydroelectric Project through land management, acquisition, and restoration.

CSKT Tribal Fisheries Program. 1993. Fisheries Management Plan for the Flathead Indian Reservation. Confederated Salish and Kootenai Tribes, Pablo, Montana. 65 pp.
This plan sets forth the goals and objectives for management of the Flathead Reservation fisheries.

DosSantos, J. M., J. E. Darling, and P. D. Cross. 1988. Lower Flathead Systems Fisheries Study, Main River and Tributaries, Volume II. Final Report 1983-1987. Report to Bonneville Power Administration, Confederated Salish and Kootenai Tribes, Pablo, Montana. 102 pp.
This document reports on the results of a multi-year fisheries study of the Lower Flathead River and its tributaries. Information is now dated, however especially because of changes in the operations of Kerr Dam.

Fraley, J. J., and B. B. Shepard. 1989. Life history, ecology and population status of bull trout (*Salvelinus confluentus*) in the Flathead Lake and River system, Montana. *Northwest Science* 63:133-143.
Bull trout in the Flathead system are threatened, so this paper is relevant even though it is dated and its focus is the Upper Flathead.

Hansen, P. L., and J. Suchomel. 1990. Riparian Inventory of the Lower Flathead River. Final Report. Montana Riparian Association. University of Montana, Missoula, Montana. 45 pp.
Interesting discussion of the impacts of Kerr Dam (when it was operated as a load-following facility) on the river's riparian vegetation.

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Bull trout in the Flathead system are threatened, so this paper is important though it is dated.

Hauer, R., and R. Potter. 1986. Distribution and abundance of zoobenthos in the Lower Flathead River, Montana. Annual report. U.S. Bureau of Indian Affairs, Flathead Agency, Pablo, Montana.
From stoneflies to caddisflies and diptera to mayflies, this report examines the aquatic insects of the river when it was operated as a "load-following facility," which caused large daily and seasonal fluctuations in the river's flow to meet power demands.

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Mackey, D. L., S. K. Gregory, W. C. Matthews, J. J. Claar, and I. J. Ball. 1987. Impacts of Water Levels on Breeding Canada Geese and Methods for Mitigation and Management in the Southern Flathead Valley, Montana. Final Report. Project No. 83-2. Bonneville Power Administration. Portland, Oregon. 162 pp.

Northwest Power and Conservation Council. "Flathead Subbasin Plan." In Columbia River Basin Fish and Wildlife Program. Portland, Oregon, 2005.
The Flathead Subbasin Plan is a comprehensive look at the physical, biological, ecological and social conditions in the Flathead River basin, from the river's source in BC to its confluence with the Clark Fork. Perhaps the most comprehensive examination of the river basin available, this document includes large amounts of information and data as well as hundreds of electronic links. Note: The links are available only on the CD version of the document as opposed to the website downloads. The CD can be requested directly from the Northwest Power and Conservation Council website above. The plan is in three parts: Assessment, Inventory, and Plan. The Assessment is probably the most valuable tool for teachers looking for additional information.

Price, Mary. 2000a. Wetland Conservation Plan for the Flathead Indian Reservation, Montana. Confederated Salish and Kootenai Tribes. Pablo, Montana.
This report provides good information on the status of wetlands on the reservation, including those along the river. It also outlines federal and tribal laws governing wetlands.

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Werner, J. K., T. Plummer, and J. Weaselhead. 1998. Amphibians and reptiles of the Flathead Indian Reservation. *Intermountain Journal of Science:* 4:33-49.
The best source of information on reptiles and amphibians on the reservation.

Living in Balance with the Lower Flathead River

A Cultural, Historical, and Scientific Resource

Perhaps the best place to begin our story is along the banks of the Lower Flathead River on the Flathead Indian Reservation in western Montana. Since the beginning of our time here, this river has been a place of special importance to tribal people. It is our highway: the water path we took to visit our many relatives to the west. It is the place where our families have always camped, gathered their foods and medicines, prayed, hunted, and fished.

And still today, it is important in these ways for us. We dig bitterroots by this river, the first food of the new spring that gives us life. We hunt deer and elk in the mountains here, and where the fisheries have not been damaged by the changes imposed on our land in recent years, we still take fish from these waters. And on almost any given day, some of our people are simply praying in these sacred and powerful places, seeking solitude, guidance, and peace along the banks of the river.

Our elders have always told us of the importance of this place and our responsibility to take care of it. We need to respect it and care for it during the short time we are here, just as our ancestors have done for many thousands of years. They ensured that we would inherit a place of beauty and abundance, and we must do the same for the generations to come. These powerful waters have been diminished by attempts to harness its wild energy, but they are still here for us to visit, and at least for a short while, to feel the presence of our ancestors and their ways of life.

Confederated Salish and Kootenai Tribes
Cultural Preservation Department